



**An Investigation into the Effects of Teacher  
Involvement and Influence on the  
Creativity of Children in the Classroom  
(Saudi Arabia)**

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# RESEARCH WORK THROUGH THE STUDY PERIOD (2009-2017)

## Conferences:

Madani, R., Moroz, A., & Baines, E. (2012). Design and manufacturing of children's remote control for child viewing. the International Conference on Polymers and Moulds Innovations. 12-14 September, 2012. Ghent, Belgium.

Madani, R., Moroz, A., & Baines, E., Makled, B.. (2014). Realising A Child's Imagination in Product Design for Both Two-Dimensional and Three-Dimensional Products Using Technology Through A Child-led Approach. the International Conference on Polymers and Moulds Innovations. 10-12 September, 2014. Guimarães, Portugal.

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Madani, R., Moroz, A., & Baines, E., Makled, B. (2015). To Assess the Involvement and Influence of Teachers in the Design Process with Children. *International Journal of Multidisciplinary Research and Development*. 2 (10), 583-587.

Madani, R., Moroz, A., Baines, E. and Makled, B. (2016) 'Realising a Child's Imagination Through a Child-Led Product Design for Both Two-Dimensional and Three-Dimensional Product', *Int. J. Materials and Product Technology*, Vol. 52, Nos. 1/2, pp.96–117.

## Patents

### The Ornamental Design for a Remote Control

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# ABSTRACT

The creative ability of a child to realise their imagination is something that is a pleasure to see in drawings created by children. There is the idea that whatever is produced by children is something pure and valuable in its own right.

Unfortunately, when children are being creative, they are subject to adult influence, especially by art teachers at school, which is reflected in their work that show signs of this influence and that such influence is an impediment to natural creativity.

This study set out to investigate the effect that the teacher and the different aspects of the teacher's role have on the creativity in children, where it was found that such involvement which includes instruction, engagement and evaluation can negatively impact creativity. The study intensively considered the teacher in the classroom and the curriculum in order to determine the different aspects of teacher involvement to be investigated.

The investigation was achieved through experimentation where children were allowed to draw under various experimental conditions. The variables of the experiment included the inclusion and exclusion of the potentially influencing factors in various combinations in order to determine their impact on the children's creativity.

The drawing outcomes produced in the experiments were evaluated for creativity through creativity assessment tools, namely; the Creative Product Semantic Scale (CPSS) to investigate creativity under the various experimental conditions. CPSS was adapted to the study by the inclusion of an 'Uninfluenced Dimension' to look for signs of influence in the work.

The results showed that the presence of all three variables, namely: instruction, engagement and evaluation had an impact on creativity and a high level of evidence of influence in the drawings. Furthermore, this study showed that curricula influences pedagogy which in turn influences creativity. Moreover, the exclusion of teacher influences reveals a new design paradigm where there is increased creativity, this not only has implications for those interested in art, pedagogy and curricula, but also those concerned with the psychological implications of creativity in children.



# ABBREVIATIONS

IPA	Interpretive Phenomenological Approach
TTCT	Torrance Test of Creative Thinking
CPSS	Creative Product Semantic Scale
CAT	Consensual Assessment Technique
CPAM	Creative Product Analysis Matrix
SPSS	Statistical Package for Social Sciences
PCA	Principle Components Factor Analysis
KMO	Kaiser Meyer Olkin

# CONTENTS

<b>ACKNOWLEDGEMENTS.....</b>	<b>II</b>
<b>RESEARCH WORK THROUGH THE STUDY PERIOD (2009-2017) .....</b>	<b>III</b>
<b>ABSTRACT .....</b>	<b>IV</b>
<b>ABBREVIATIONS .....</b>	<b>V</b>
<b>CONTENTS.....</b>	<b>VI</b>
<b>LIST OF TABLES.....</b>	<b>VIII</b>
<b>LIST OF FIGURES .....</b>	<b>IX</b>
<b>1 INTRODUCTION CHAPTER ONE.....</b>	<b>1</b>
1.1 INTRODUCTION .....	2
1.2 ARGUMENT.....	2
1.3 AIM .....	4
1.4 OBJECTIVES .....	4
1.5 KEY RESEARCH QUESTION .....	4
1.6 HYPOTHESES.....	4
1.7 MOTIVATION FOR THE STUDY .....	4
1.8 CONTRIBUTION .....	6
1.9 KEY CONCEPTS .....	7
1.10 THEORETICAL FRAMEWORK.....	10
1.11 METHODOLOGY .....	12
1.12 THESIS STRUCTURE .....	15
1.13 CONCLUSION .....	16
<b>2 REVIEW OF THE LITERATURE CHAPTER TWO .....</b>	<b>17</b>
2.1 INTRODUCTION .....	18
2.2 ART AND DESIGN.....	18
2.3 ART AND THE PSYCHOLOGY OF THE CHILD.....	19
2.4 CREATIVITY .....	20
2.5 THE CHILD’S IMAGINATION AND CREATIVITY .....	23
2.6 PURE ART .....	26
2.7 ARTISTIC DEVELOPMENT .....	28
2.8 CHILDREN, ART AND EDUCATION .....	30
2.9 COLLABORATIVE AND PARTICIPATORY ART AND DESIGN .....	31
2.10 INFLUENCE OF ADULT INVOLVEMENT .....	37
2.11 ETHNICITY, CULTURE AND GENDER.....	42
2.12 CONCLUSION .....	42
<b>3 PRIMARY RESEARCH CHAPTER THREE .....</b>	<b>44</b>
3.1 INTRODUCTION .....	45
3.2 ENQUIRY PARADIGM.....	45
3.3 THE METHODOLOGICAL APPROACH.....	47
3.4 ADOPTED METHODOLOGY: PHENOMENOLOGY .....	48
3.5 ETHICAL CONSIDERATIONS .....	50

3.6	METHODS .....	51
3.7	CONCLUSION .....	76
<b>4</b>	<b>DESIGN OF THE EXPERIMENT AND EVALUATION CHAPTER FOUR.....</b>	<b>77</b>
4.1	INTRODUCTION.....	78
4.2	EXPERIMENT METHODOLOGY .....	78
4.3	EXPERIMENT DEVELOPMENT .....	82
4.4	EVALUATION .....	91
4.5	CONCLUSION .....	105
<b>5</b>	<b>FINDINGS, ANALYSIS AND STATISTICAL EVALUATION USING (SPSS) CHAPTER FIVE</b>	
	<b>106</b>	
5.1	INTRODUCTION.....	108
5.2	ANALYSIS OF “ELABORATION & SYNTHESIS”, “NOVELTY” AND “UNINFLUENCED” DIMENSIONS..	109
5.3	ANALYSIS OF INDIVIDUAL VARIABLES (EXPERIMENTS 2, 6 AND 7).....	116
5.4	ANALYSIS OF COMBINATION VARIABLES (EXPERIMENTS 3, 4 AND 5) .....	119
5.5	ANALYSIS OF CONTROL EXPERIMENTS.....	121
5.6	ANALYSIS OF CONTROL EXPERIMENT (ALL VARIABLES) AND EXPERIMENT OF NO VARIABLES ....	123
5.7	ANALYSIS EXPERIMENTS OF INDIVIDUAL VARIABLES AND EXPERIMENT OF NO VARIABLES.....	124
5.8	ANALYSIS EXPERIMENTS OF COMBINATION VARIABLES AND EXPERIMENT OF NO VARIABLES.....	125
5.9	ANALYSIS OF ELABORATION & SYNTHESIS DIMENSION.....	127
5.10	ANALYSIS OF NOVELTY DIMENSION .....	137
5.11	ANALYSIS OF UNINFLUENCED DIMENSION .....	145
5.12	ANALYSIS OF CONTROL GROUP AND NON VARIABLES .....	152
5.13	DISCUSSION .....	157
5.14	CONCLUSION .....	159
<b>6</b>	<b>DISCUSSION &amp; CONCLUSION CHAPTER SEVEN .....</b>	<b>161</b>
6.1	INTRODUCTION.....	162
6.2	DISCUSSION .....	162
6.3	OUTCOMES .....	175
6.4	CONTRIBUTIONS AND IMPLICATIONS.....	177
6.5	CONCLUSION .....	178
6.6	LIMITATIONS OF STUDY .....	180
6.7	RECOMMENDATION FOR FUTURE STUDY .....	180
	<b>REFERENCES.....</b>	<b>185</b>
	<b>BIBLIOGRAPHY .....</b>	<b>196</b>
	<b>APPENDIX .....</b>	<b>209</b>

# LIST OF TABLES

TABLE 3-1 NECESSITY OF INVOLVEMENT IN DESIGN PROCESS ACTIVITIES .....	59
TABLE 3-2 CURRICULUM REQUIREMENTS AND STANDARDS CAN BEST ASSESS CREATIVITY .....	59
TABLE 3-3 DEPENDENCY OF CHILDREN.....	59
TABLE 3-4 AGREEMENT WITH INDEPENDENT WORKING LEADS TO MORE CREATIVE DESIGNS .....	60
TABLE 3-5 OPINION OF POSITIVE OR NEGATIVE INFLUENCE OF ASPECTS OF INVOLVEMENT .....	60
TABLE 3-6 TEACHERS' PERSONAL OPINION INDICATOR OF CREATIVITY.....	61
TABLE 3-7 OBSERVATION CHECKLIST OF STRUCTURE OF THE ART CLASS.....	71
TABLE 4-1 DESIGN OF THE EXPERIMENT .....	90
TABLE 4-2 CPSS INSTRUMENT.....	101
TABLE 5-1 CRONBACH'S ALPHA.....	110
TABLE 5-2 KAISER-MEYER-OLKIN (KMO) AND BARTLETT'S TEST.....	110
TABLE 5-3 MULTIPLE RESPONSE REGRESSION RESULTS, ALL SUB-DIMENSIONS .....	111
TABLE 5-4 ANOVA .....	112
TABLE 5-5 CRONBACH'S ALPHA.....	127
TABLE 5-6 ITEM-TOTAL STATISTICS.....	127
TABLE 5-7 CRONBACH'S ALPHA.....	128
TABLE 5-8 ITEM-TOTAL STATISTICS.....	128
TABLE 5-9 KAISER-MEYER-OLKIN (KMO) AND BARTLETT'S TEST.....	129
TABLE 5-10 TOTAL VARIANCE EXPLAINED.....	129
TABLE 5-11 COMPONENT MATRIX .....	131
TABLE 5-12 MULTIPLE RESPONSE REGRESSION .....	132
TABLE 5-13 ANOVA.....	133
TABLE 5-14 CRONBACH'S ALPHA .....	137
TABLE 5-15 ITEM-TOTAL STATISTICS .....	137
TABLE 5-16 KAISER-MEYER-OLKIN (KMO) AND BARTLETT'S TEST.....	138
TABLE 5-17 TOTAL VARIANCE EXPLAINED.....	138
TABLE 5-18 COMPONENT MATRIX .....	140
TABLE 5-19 MULTIPLE RESPONSE REGRESSION .....	141
TABLE 5-20 ANOVA.....	142
TABLE 5-21 CRONBACH'S ALPHA .....	145
TABLE 5-22 ITEM-TOTAL STATISTICS .....	145
TABLE 5-23 KAISER-MEYER-OLKIN (KMO) AND BARTLETT'S TEST.....	146
TABLE 5-24 TOTAL VARIANCE EXPLAINED.....	146
TABLE 5-25 COMPONENT MATRIX .....	147
TABLE 5-26 MULTIPLE RESPONSE REGRESSION .....	148
TABLE 5-27 ANOVA.....	149
TABLE 5-28 CRONBACH'S ALPHA .....	152
TABLE 5-29 KAISER-MEYER-OLKIN (KMO) AND BARTLETT'S TEST.....	152
TABLE 5-30 TOTAL VARIANCE EXPLAINED.....	153
TABLE 5-31 COMPONENT MATRIX .....	155
TABLE 5-32 MULTIPLE RESPONSE REGRESSION FOR ALL DIMENSIONS.....	158
TABLE 6-1 ADAPTED FROM THE IBF PARTICIPATORY CONTINUUM MODEL (READ ET AL., 2002).....	163
TABLE 6-2 ADAPTED FROM THE IBF PARTICIPATORY CONTINUUM MODEL (READ ET AL., 2002).....	177

# LIST OF FIGURES

FIGURE 1-1 FRAMEWORK OF MOTIVATION .....	6
FIGURE 1-2 FRAMEWORK OF METHODOLOGY .....	14
FIGURE 1-3 FRAMEWORK OF THESIS STRUCTURE .....	15
FIGURE 2-1 TADPOLE PERSON. SOURCE: WILSON AND WILSON (2009).....	27
FIGURE 2-2 DRUIN ROLES .....	33
FIGURE 3-1 VENN METHODS .....	51
FIGURE 3-2 TRIANGULATION METHODS.....	53
FIGURE 4-1 DIMENSIONS, SUBSCALES AND ADJECTIVES OF ADAPTED CPSS .....	101
FIGURE 5-1 OVERALL EFFECT OF CREATIVITY.....	109
FIGURE 5-2 LEAST SIGNIFICANT DIFFERENCES TEST .....	113
FIGURE 5-3 MULTIPLE PLOT OF STATAPUT DATE .....	115
FIGURE 5-4 INDIVIDUAL VARIABLES.....	117
FIGURE 5-5 COMBINATION VARIABLES .....	120
FIGURE 5-6 CONTROL GROUP EXPERIMENTS .....	123
FIGURE 5-7 CONTROL EXPERIMENT (ALL VARIABLES) AND EXPERIMENT OF NO VARIABLES .....	124
FIGURE 5-8 INDIVIDUAL VARIABLES AND EXPERIMENT OF NO VARIABLES .....	125
FIGURE 5-9 COMBINATION VARIABLES AND EXPERIMENT OF NO VARIABLES .....	126
FIGURE 5-10 PARETO DIAGRAM FOR PRINCIPAL COMPONENT.....	130
FIGURE 5-11 THE ITEMS ON THE PLANE OF THE FIRST TWO PRINCIPAL COMPONENTS.....	132
FIGURE 5-12 LEAST SIGNIFICANT DIFFERENCES TEST .....	134
FIGURE 5-13 MULTIPLE PLOT OF STATAPUT DATE .....	136
FIGURE 5-14 PARETO DIAGRAM FOR PRINCIPAL COMPONENT.....	139
FIGURE 5-15 LEAST SIGNIFICANT DIFFERENCES TEST .....	143
FIGURE 5-16 MULTIPLE PLOT OF STATAPUT DATE .....	144
FIGURE 5-17 PARETO DIAGRAM FOR PRINCIPAL COMPONENT.....	147
FIGURE 5-18 MULTIPLE PLOT OF STATAPUT DATE .....	150
FIGURE 5-19 LEAST SIGNIFICANT DIFFERENCES TEST .....	151
FIGURE 5-20 PARETO DIAGRAM FOR PRINCIPAL COMPONENT.....	154
FIGURE 5-21 THE ITEMS ON THE PLANE OF THE FIRST THREE PRINCIPAL COMPONENTS.....	156

# 1 INTRODUCTION CHAPTER ONE

## CONTENTS

1.1	INTRODUCTION.....	2
1.2	ARGUMENT .....	2
1.3	AIM .....	4
1.4	OBJECTIVES.....	4
1.5	KEY RESEARCH QUESTION.....	4
1.6	HYPOTHESES .....	4
1.7	MOTIVATION FOR THE STUDY .....	4
1.8	CONTRIBUTION.....	6
1.9	KEY CONCEPTS .....	7
1.10	THEORETICAL FRAMEWORK.....	10
1.11	METHODOLOGY .....	12
1.12	THESIS STRUCTURE .....	15
1.13	CONCLUSION .....	16

## FIGURES

FIGURE 1-1	FRAMEWORK OF MOTIVATION .....	6
FIGURE 1-2	FRAMEWORK OF METHODOLOGY .....	14
FIGURE 1-3	FRAMEWORK OF THESIS STRUCTURE .....	15

## **1.1 Introduction**

This chapter introduces the motivations for the study, the research questions and the associated aims and objectives. There is an overview of the contributions that the study will make and the key concepts that are relevant to the study which include art and design, psychology and the imagination of the child, creativity, participatory design and pedagogical issues. Finally, the chapter presents an overview of the theoretical framework, the methods and methodology and the structure of the thesis.

## **1.2 Argument**

The imagination of the child is something that is a pleasure to see in art created by children and we often think that what we are seeing is a representation or reflection of the child's imagination. This study hypothesises that when children are engaged in producing art they are in fact subject to a number of influences that taint the art and negatively affect their creativity. Thus it is the intention of this study to analyse the possible effects of these influences on creativity, which include the different approaches to pedagogy where children are being creative in art.

The presence of an adult is often in the form of collaboration and participation found in participatory design, or facilitation, which is the case with art and design teaching. The teacher also plays a role in judging or assessing work, which has also been shown to affect creativity Amabile (1998) Cassou (2004). Overall, this adult presence is thought to be influencing factors on outcomes in relation to the creativity that they exhibit.

Therefore, this study wants to investigate influences that come in the form of adults who are charged with the responsibility of helping children develop their creative ability, i.e. teachers.

There are a number of different ways how the teacher can influence the child and these are directly related to the types of involvement that are required from the curriculum and include the instructions that are given to the children, the engagement with the children which include giving advice, feedback and encouragement, and finally, the fact that teachers judge the work against criteria set out in the curriculum. Therefore, the investigation into the influences on children's creativity is based on these different aspects of teacher involvement which inform the experimentation of the study.

Creativity in children is something that is recognised as an aim of the curriculum: that it should provide the opportunity for children to think creatively and be innovative and also become enterprising (Sharp, 2004). The present study contributes to the development of curricula, with the afore-mentioned considerations in mind; because it proposes to reveal aspects of teaching that have an impact on creativity towards informing the development of such curricula.

The study first sought, through primary and secondary research, to establish the current state as regards the way that teachers approach art with children, the extent of teacher involvement and the different ways that were involved. Three types of involvement were identified as instruction, engagement and evaluation.

These types of involvement and the way that teachers engage children are directly the result of the curriculum, and it is the intention of this study to see if the curriculum as something that informs pedagogical approaches has an influence on creativity. Therefore, the results of the study are intended for reconsideration of curriculum development towards achieving greater creativity in children.

The ways that teachers are involved inform the variables that were tested in the experiment in order to determine their effects on creativity, both individually and in combination. This was achieved through a series of experiments which tested the inclusion and exclusion of these three types of involvement as controls, tested the effect of each variable and tested variables in combination in order to determine the effect of these variables on creativity.

The specific ways that teachers were involved with children within each of these types of involvement were also investigated in primary and secondary research prior to the experimentation. These served to inform how the teachers should engage the children during each of the main variables. For example, in reference to the engagement variable, it was found during the primary and secondary research that teachers would offer children advice and tips, encouragement and feedback, and in order to simulate this same classroom experience these were included in the experimentation.

The primary research also contributed to the motivation for the study where it was found that involvement with children was very much informed by the curriculum and teachers assigned much importance to their role in the pursuit of developing creativity in children.

The experiments involved children producing art to be judged for their creativity. Because the study is interested in possible influences, negative or otherwise, on the creativity in children then signs of influence in their work were considered. This was in addition to the commonly accepted signs of creativity that are found in the adopted creativity assessment tools, namely, Creative Product Semantic Scale (CPSS). Therefore, creativity was assessed in terms of signs of creativity and also signs of influence. In order to achieve assessment of signs of creativity the tool, CPSS was adopted, CPSS is a tool that looks at different elements of creativity in detail, such as novelty which considers elements that represent for example newness, freshness, novelty, unusualness and uniqueness. In order to assess for signs of influence the CPSS tool was adopted to include an additional dimension named 'Uninfluenced' in addition to the 'Novelty' and 'Elaboration and Synthesis' dimensions which assess for creativity.



### **1.3 Aim**

The main aim of this study is to investigate the effects of aspects of teacher involvement as influences on the creativity of children in Saudi Arabia.

### **1.4 Objectives**

The main objectives of the study are:

- To understand the ways that children participate in art with adults.
- To assess the role of the teacher, their influence and involvement in the artistic process.
- To study the impact of adult involvement on the creativity of children's outcomes
- Contribute to understanding the influences on the creativity of children for teaching purposes.

### **1.5 Key Research Question**

The main research question that will be asked in the study is the following: "Do the aspects of teacher involvement have an effect on creativity in children?"

### **1.6 Hypotheses**

H1. Teacher involvement is an influence that has an effect on the creativity of children's art.

H2. The absence of teacher involvement leads to an increase in creativity.

H3. Some aspects of teacher involvement are more significant influencing factors in the impact on creativity than others.

H4. Curriculum can have an indirect effect on creativity in children.

### **1.7 Motivation for the Study**

Children have vivid imaginations and the concern is that the process of realising their imaginations when being creative is inhibited by adult influence, while if they were free to realise their imaginations free of such influence, then this will reveal a purer art which is more reflective of what the child wants to do or what is in their minds and shows more creativity and less signs of influence. This study aims to investigate this idea, whether adult influence will have an impact on the art outcomes of children which is reflected in increased creativity and reduced evidence of adult influence.

The idea of whatever children create is pure and should be accepted is supported by Jean Dubuffet who says that children's work is not tainted by social constructs and that adults are influenced by rules (commonly accepted ways of doing things) and expectations. Unfortunately, children are influenced by adults influences as well as expectations and ways of doing art, and it is a motivation of this study to examine if and how this has an effect on creativity and to contribute a way for children to realise their imaginations leading to a new design paradigm that can be realised in the school through reconsideration of the development of curricula.

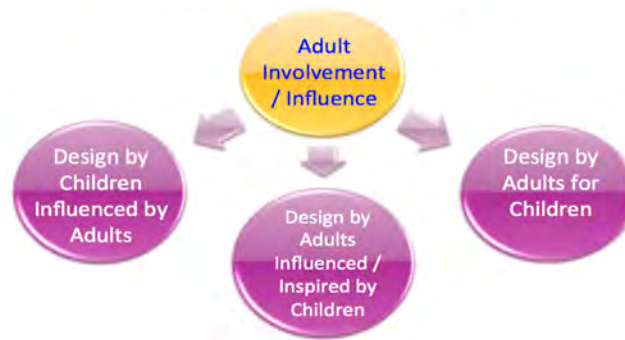
If we consider the idea of 'pure art' as proposed by Dubuffet, then there should be no judgment of its quality, therefore having a teacher not only influences the child through their pedagogical involvement during the creative process but they also judge the work to be acceptable or not acceptable according to requirements of the curriculum. Therefore, the study is motivated to study the effect of not only direct involvement in the creative process itself but also the effect on children when they know that their work is being judged.

This idea follows from the researcher's Master's Degree, which was a remote control for children that controlled unsuitable content on the television. Throughout the study the researcher endeavored to create a design that would be appealing to children. Existing toy designs, which have been produced by other adults, inspired much of the research or the researcher took inspiration from children's ideas to come up with the final design. This caused the designer to question the value of input from adults and children on children's designs and become interested in the imagination of the child in art.

The researcher envisages that a child's imagination can be realised better if adult influences are removed and the study is designed to investigate this. It is hoped that if the children are more involved in the creative process through being more independent due to less involvement by the teacher.

In light of the idea that it is hoped that there is a new design paradigm which is more reflective of a child's creativity and imagination, it is often the case that designs that are intended for children are often created by children but influenced by adults, designed by adults with inspiration from children or just completely designed by adults without input from children and the overall problem is that there is significant involvement and influence from adults. This influence presents itself in different ways that include the pedagogical approach Figure 1-1.

Figure 1-1 Framework of Motivation



Therefore, this research will investigate such influences towards the achievement of a new approach to considering children and creativity in art. This research proposes that art by children and for children should be more reflective of the child's imagination, not only because such art may be more accepted by children but also because it may reveal a new design genre if they are given the opportunity to produce art without the involvement and subsequent influence from adults. The fact that children's potential has been overlooked is something that is surprising for the researcher and should be addressed.

There is a need to a shift away from design that is influenced in some way by adults which is found in mainstream products and design everywhere. There needs to be more respect for children's ability to produce art independently and how these will be more acceptable to children. Therefore, one of the main motivations of this study is to bring to the world a new genre of pure art that is uninfluenced by adults and to explore the possibilities that can be produced by children. This new design paradigm is envisaged to be extended to the world of design which will not only mean that there could be designs by children for children, but also the principles of designing independently of adult influences could be extended to allow children more involvement in the manufacturing process and therefore, in more of the entire design process.

## 1.8 Contribution

One of the contributions of this study is that it investigates participatory design between adults and children in the school towards verifying the hypotheses of this study which include that various types of adult involvement have a negative impact on the creativity in children and the absence of such involvement will lead to increased creativity. Much of the literature about art and design involving children is mostly within the framework of participatory design, which at all levels involves adults, even where there is an attempt to have purely facilitated design, the presence of an adult influences the process and even reduces the level of the child's involvement (Read et al. 2002). Therefore, a contribution of this study is an understanding of how such participation has an impact on creativity which can lead to new possibilities in the way that art and

design is approached in schools. More specifically, the research can contribute to a new approach that is outside of the current participatory design models. This new approach can be extended to the entirety of art and design processes in schools.

The result of this study can inform a new approach to art and design that is more reflective of children's imagination leading to a new purer art and design. This study will contribute to revealing more of what is in the child's imagination and show more of what children are capable of in terms of creativity where adult influences are removed.

Moreover, this study makes a significant contribution to art education at secondary level where the findings of this study could be used to develop curricula and also a contribution to knowledge in general. Furthermore, the literature shows that allowing a child to be free in their creation of art and design has numerous benefits for their development in terms of academic progress, their social skills and also overall psychological development. Moreover, it can be a remedy for problems associated with such areas.

## **1.9 Key Concepts**

This study is about seeing if art by children is more creative with the absence of adult involvement. From this it is hoped that a new way and style of art will be revealed that reflects the imagination of the child. Therefore, in relation to this aim of the study there are a number of key concepts that are relevant which include the meaning of art, art and the psychology of the child and the child's imagination, creativity, education and pedagogy, collaborative and participatory design, adult influence and involvement. The key concepts are presented here and shown how they relate to this study.

### **1.9.1 Art and Design**

The Oxford dictionary defines art as 'The expression or application of human creative skill and imagination, typically in a visual form such as painting or sculpture, producing works to be appreciated primarily for their beauty or emotional power' and 'Works produced by human creative skill and imagination' and 'Creative activity resulting in the production of paintings, drawings, or sculpture' (Oxford Dictionary). What is noticeable about these definitions is that creative skill is a key part.

Design on the other hand is something that is defined by the Oxford Dictionary as the following: 'A plan or drawing produced to show the look and function or workings of a building, garment, or other object before it is made' and 'The art or action of conceiving of and producing a plan or drawing of something before it is made' (Oxford Dictionary). Here the focus is clearly on planning something. In looking

what writers have said about the difference between art and design there is the idea that art is something that is just for the sake of beauty and that design has a more functional purpose.

A common idea that is found in the literature about the difference between art and design is that art asks questions, and design answers questions (Duvall, 2014), or that art is driven by experience and design is driven by solutions (Campbell, 2013). For art there are no rules or set processes, however, for design there are rules in that even if a design is considered not aesthetically pleasing, there is an underlying structure that solves a problem (Duvall, 2014). The present study is concerned with the former, where the children will produce artistic drawings.

### **1.9.2 Psychology of the Child and the Imagination**

When looking at the psychology of the child in relation to art that they produce it is important to understand that children are continually developing and art and how they produce art are also changing, moreover, their perceptions of art and their idea of representation also change (Matthews, 1999).

It has been shown that there are universal psychology traits among children in relation to art that are found to be the same around the world. These traits are related to the development of how children draw and represent objects. This idea that has been presented (Wilson and Wilson, 2009) shows that in early childhood the way that children create art is the result of processes that come from within the child and not from influences external to the child.

Development is another key area that has to be addressed in relation to art and the psychology of the child. As children develop they are more able to make critical judgments about their own work and can develop their perceptions about the world around them. Moreover, as children grow older they develop the ability to recognise different styles and methods in art, whereas in earlier childhood they only recognise art by its subject matter (Gardner 1990).

Studies show that as children going through development in art as they get older start to show signs of influence in their work; such influences include taught conventional ways of producing art (Lowenfeld and Brittain, 1982).

When discussing art with psychology, the imagination of the child is important because art produced by children comes from the imagination. The imagination is something that is coupled with creativity to produce art; it is the image in the mind that the child wants to realise (Fuchs Holzer, 2009). Kristensen 2004 say that the imagination is a representation of what does not yet exist, thus to imagine is to envision or create. Although it is said that the imagination of the child is something that is pure, and this study wants to gain

this pure imagination in art, it is also obvious that the imagination of the child is affected by external life influences (Cohen and MacKeith, 1991).

### 1.9.3 Creativity

Defining creativity has not been easy and many writers have contributed ideas about what creativity means, however, most theorists agree that creativity involves the imagination, originality of ideas, problem solving, productivity and the ability to produce an outcome of value (Sharp, 2004). The present study agrees that creativity is about the imagination, originality and the ability to produce an outcome of value and that value is subjective.

When creating art creativity is one of the key components because it is the tool that children use to realise their imagination. In relation to this idea one of the arguments about creativity is that creativity requires skills, that a child is not able to be artistically creative unless they have the required technical skills to do so Chan and Zhou (2010). However, this study rejects this idea that a child would need creative skills to be creative and adopts the position that whatever the child produces is pure and valuable.

Garaigordobil (2006) compiled a list of elements of creativity using a number of definitions from theoretical models from writers, which included Amabile (1983) Barron (1965), Csikszentmihalyi (1996) Guilford (1950) and Sterberg and Lubart (1991), the following is the list of elements included:

*Novelty; insightful associations, sense of humor; fantasy capable of transcending reality: breaking away from reality; unusual perspective: talent for seeing things in different ways; transformation: capacity for deconstructing reality and restructuring it in different and original forms; expressive strength: expressive impact through color, movement, the action or story represented, or type of stroke* (Garaigordobil, 2006 p.333).

This study does not deny the idea that creativity requires skills, put forward by Chan and Zhou (2010) however; this study does not measure this type of creativity. This study is interested in the creativity that is a personal trait and personal style that is not influenced by an adult involved in the process.

### 1.9.4 Participatory Design

The most important key concept in this study is the concept of participatory design. Participatory design is about the child engaging in art and design with an adult and it is important to note that this concept includes varying degrees of participation from the adult. Perhaps the best way to explain participatory design and the varying degrees of involvement is by using the IBF (Informant, Balanced and Facilitated) Participatory

Continuum Model by Read et al. (2002). In this model we have the highest level of adult involvement in the design process, which is informant design, this is where the child is merely an informant in the design and the adult carries out the design. Where the child becomes more involved is in balanced design where they are equal partners in the design process. Finally, there is facilitated design where the child creates and realises the design and the adult is only the facilitator. The main idea behind all of these approaches is that there is adult involvement to some extent. More complex levels or types of involvement are offered in other models such as Hart's ladder which ranges from where are apparently given a voice in the design but it is not really noted, to designs that are initiated by children and adults become involved in developing those designs.

The models represent the different levels of involvement, however, it is equally important to understand that there are different approaches within participatory design. These approaches include Craft to Creativity (Jackson, 2009), which encourages children to be independently creative through specific pedagogy; the Nurture Natural approach (McArdle, 2001) where the child is at the centre of the program and spontaneity is encouraged, and importantly in this approach all art produced is valuable because it is produced freely; and the Point Zero Method (Cassou, 2004) which says that children create for the sake of play and they do not have a projected result and what they create should come from within the child and not be polluted or influenced, moreover, it aims to remove the pressure of expectation that adults place on children.

Elements related to participatory design, such as the involvement of the teacher, have been shown to influence design outcomes from children and their drawing experience (Roth, 1996, Rose et al., 2006, Burkitt et al., 2010).

### **1.9.5 Art and Pedagogy**

The area of education and pedagogical approaches in art is very important in this study. The main reason for this is that this area has been one of the ways that children have been influenced by teachers and the children's approach to art has been influenced by pedagogy. Moreover, when children are engaged in art in schools, teachers play a major role and children look to teachers for approval.

## **1.10 Theoretical Framework**

The aim of this study is to investigate the effect on creativity of adult involvement. Therefore, theories and ideas will be sought from different fields. Theories associated with this idea include those that are about children and art and design generally, and more specifically, the psychology of children related to art and design.

### **1.10.1 Non-interventionist Theory**

Perhaps the most significant contributor and influencer in the area of allowing children freedom in their art and design through a non-interventionist approach is Franz Cizek (1936). Franz Cizek is credited with discovering the idea that children all over the world produce similar forms in their work and there is a universal symbolism, this was an early theory of natural flowering that prohibited the natural course of children's graphic development to avoid the child being irrecoverably affected.

Franz Cizek's approach to teaching art to children was minimal and was unlike the other skill-based programs, his aim was to foster self-expression in his pupils. He created a child friendly environment where formal instruction was non-existent the aim was to nurture creative tendencies that he believed was inherent in all children, allowing free exploration.

Cizek was not interested in creating artists but wanted to allow children to have access to their own personal creativity. Moreover, he found that without any instruction from adults and in a friendly atmosphere children liked to make art.

Cizek opened his own school where children were free to come and be creative. In relation to this present study Cizek allowed his children to explore different materials and were engaged in drawing, collages, silhouettes, wood and plaster carving, clay modeling, embroidery and wood block printing and he would tell the children that from using all materials something creative can be made (Viola, 1942).

### **1.10.2 Attribution Approaches to Creativity**

In understanding creativity and creative behavior dispositional approach is used however, the criticism of these approaches is that they do not consider the situational factors that exert an influence of creativity (Amabile, 1995, Kasof, 1995). The present study hypothesises that the external situational influence of the presence and involvement of an adult, in this case a teacher has an impeding effect on creativity in children. Therefore, part of the theoretical framework of the present study is comprised of theories on those who say that we cannot ignore situational factors in favour of dispositional factors. These include the ideas by Kasof (1995) who favours the attributional approach to understanding creativity which considers the cultural, social-structural and environmental factors as influences on creativity which allows creativity to be understood across individuals, situations and time. Amabile (1995) measures creativity and says that an understanding of creativity is through a social-situational approach that considers the variables that are manipulated or controlled. In the case of the present study the social situation is the classroom setting where the children find themselves being creative and it can be argued that other variables could include the type



and extent of involvement of the teacher. Although it may be apparent that the present study is similar to Amabile in terms of measurement of creativity, the difference is that the present study rejects the resolution dimension which is intended more for the measurement of skill.

### **1.10.3 Pure Art**

Franz Cizek admired children's artwork because he saw that their expression were direct and pure – he was fascinated by the authentic expressions found in untrained work - he was very strongly in favour of the idea that children should be free to revel in self-discovery.

Jean Dubuffet who coined the phrase art brut (raw art) or outsider art also expressed the idea of pure art. This is art that is produced by non-professionals including children, this was art that was free of intellectual norms.

In consideration of these ideas the study adopts the premise of the 'democratic' definition or view of creativity as opposed to the 'elite' view (Sharp, 2004). The democratic view of creativity is that all people are capable of creative achievement and that everyone should be allowed to achieve according to their own abilities (Robinson Report, 1999). The elite view on the other hand sees that only a few rare people are creative and that they have unusual talents (Robinson Report, 1999). Although this study does recognise the importance of the role of education in developing children's artistic and design abilities, it wants to explore and prove that a new way of art and design can be achieved that is much closer to the imagination of the child and free from adult influences and that this can be achieved within the education setting.

## **1.11 Methodology**

The study adopts a phenomenological approach because the study aims to reveal the teacher's experience of teaching and involvement with children during the creative process, where such experiences are the basis of the establishment of the variables that are tested for their influence on creativity in children's work.

In addition to the secondary research of the review of the literature, this study has employed primary research methods, which are now addressed. These include questionnaires with teachers; interviews with teacher, observation of classroom teaching and analysis of the curriculum, all of these methods are employed prior to the development of the experimentation as they reveal the various factors that are required for the design and development of the experiment.

The research methodology involves the collection of quantitative data from the questionnaires and qualitative data from the questionnaires, interviews, observation and document analysis. Therefore, the study adopts a mixed methods approach.

Because four research methods were applied and therefore, various results are derived, triangulation was conducted in order to ensure the validity of the results. Triangulation will ensure that there is consistency of the findings derived from the various methods.

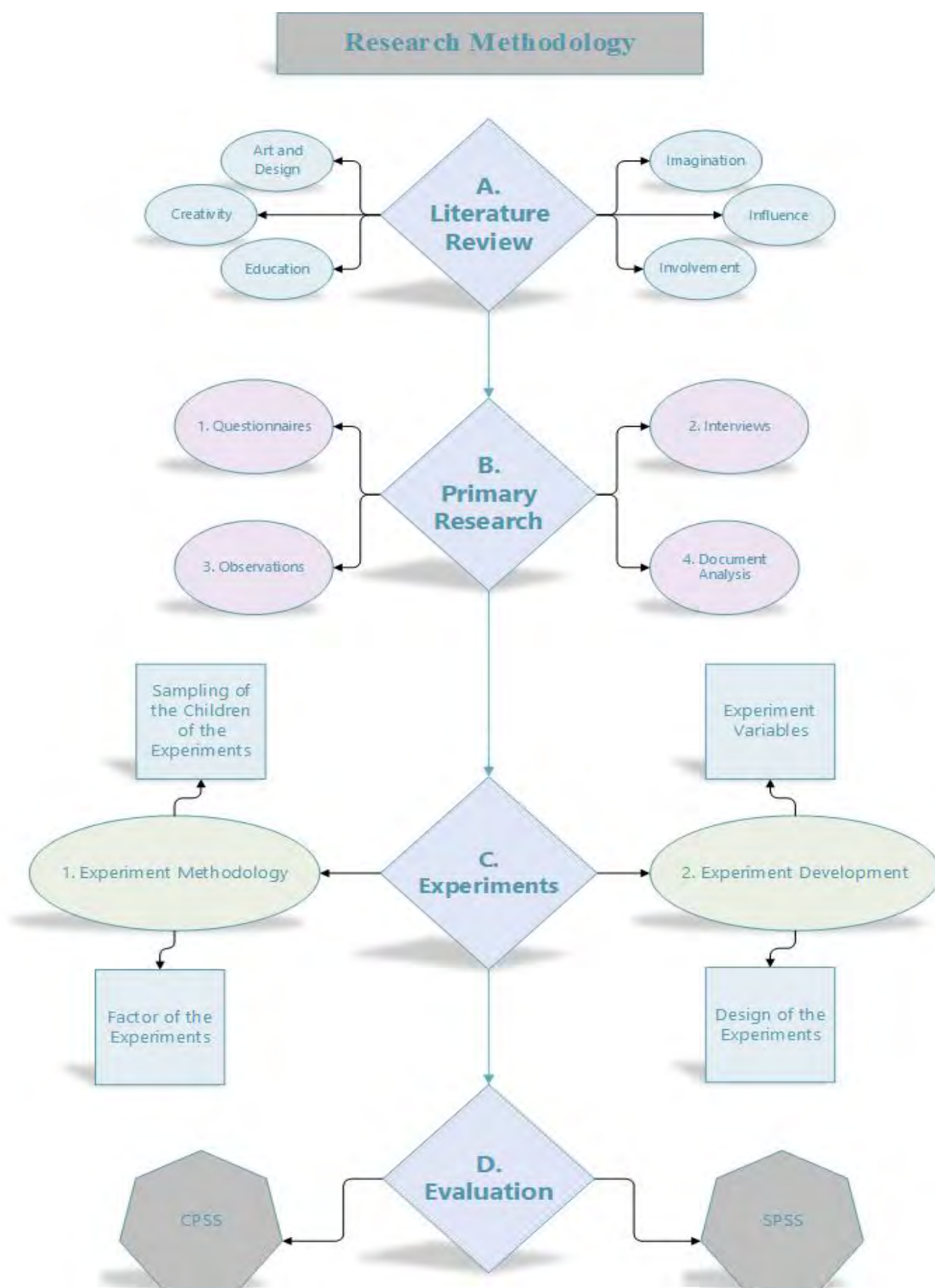
In addition to these methods was the experiment itself, which was used to investigate the effect of teacher involvement variables on creativity in children. The experiment involved the children drawing with the inclusion and exclusion of the identified variables to investigate the impact that they have on the creativity of children engaged in art.

Upon completion of the experiment the art that was produced by children needed to be assessed for their level of creativity. This evaluation of creativity was conducted for all of the drawing that were produced in the variable and control experiments. Through comparison of the creativity between the drawings produced in the different experiments, it was possible to verify if certain experimental variables had an impact on creativity, more specifically, for example, if the inclusion of engagement impacts negatively or positively on creativity. For this, the assessment tools Creative Product Semantic Scale (CPSS) was employed.

In order to conduct the data analysis, the researcher employed the Statistical Package for Social Sciences (SPSS). The researcher also employed appropriate statistical techniques to analyse the collected data, which included Factor Analysis, Kaiser-Meyer-Olkin (KMO) and Bartlett's Test, Correlation Matrix, Variance Explained, Component Matrix and analysis of Fractional Factorial Design. Moreover, Cronbach's Alpha coefficient was used to test the reliability the data.

The primary research is presented in Chapter Three and will focus on the methods employed, including their justification, development and how they are used.

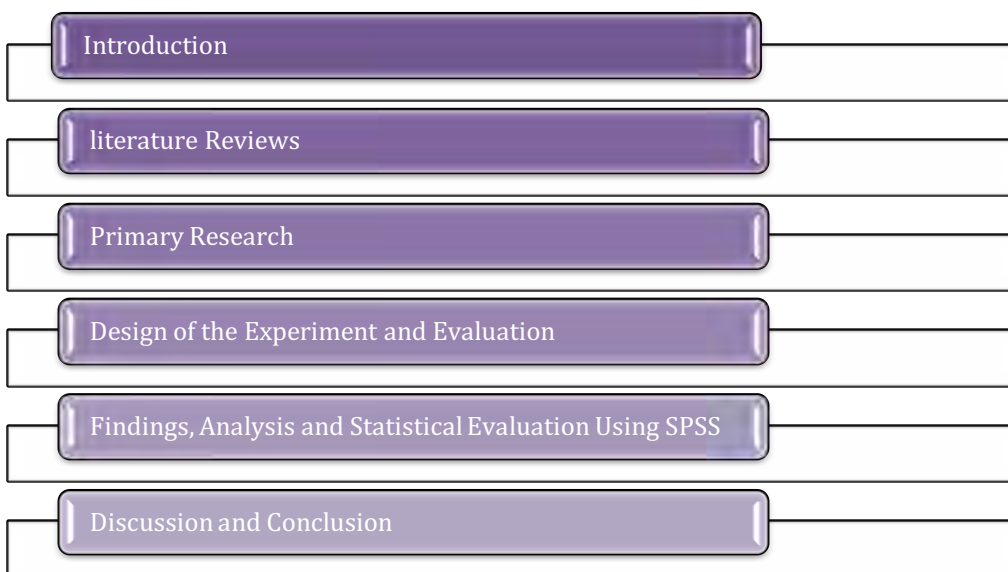
Figure 1-2 Framework of Methodology



## 1.12 Thesis Structure

The thesis is divided into Six chapters. Chapter One, the introduction, introduces the study, its motivations, the research questions and the aims and objectives. Chapter Two reviews the literature relevant to the study, which includes literature related to creativity and children, the imagination, pure art and influence. Chapter Three presents the primary research of the study including the enquiry paradigm, the methodological approach and the methods employed. Chapter Four presents the design of the experiment including its development and evaluation. Chapter Five presents findings, analysis and statistical evaluation using (SPSS). Chapter Six provides the discussion for the study and concludes the thesis Figure 1-3.

*Figure 1-3 Framework of Thesis Structure*



## **1.13 Conclusion**

This chapter has introduced the study and why it is being pursued. Specifically, there was an introduction to the idea of adult involvement and influence in the participatory design process with children. The motivation for this study was to investigate the effect of such influences on creativity in children towards a new approach to art and design with children in the school and a new design genre by children. The original contribution of the study was presented to include this new design genre together with a greater understanding of adult influence on child creativity in the classroom. This chapter also presented the key concepts of the study and the theoretical framework within which the study is situated.

## 2 REVIEW OF THE LITERATURE CHAPTER TWO

### CONTENTS

2.1	INTRODUCTION.....	18
2.2	ART AND DESIGN .....	18
2.3	ART AND THE PSYCHOLOGY OF THE CHILD .....	19
2.4	CREATIVITY .....	20
2.5	THE CHILD’S IMAGINATION AND CREATIVITY .....	23
2.6	PURE ART.....	26
2.7	ARTISTIC DEVELOPMENT .....	28
2.8	CHILDREN, ART AND EDUCATION .....	30
2.9	COLLABORATIVE AND PARTICIPATORY ART AND DESIGN .....	31
2.10	INFLUENCE OF ADULT INVOLVEMENT .....	37
2.11	ETHNICITY, CULTURE AND GENDER.....	42
2.12	CONCLUSION.....	42

### FIGURES

FIGURE 2-1 TADPOLE PERSON. SOURCE: WILSON AND WILSON (2009).....	27
FIGURE 2-2 DRUIN ROLES.....	33

## **2.1 Introduction**

The nature of this study means that it involves more than just one area. This study needs to consider a number of different disciplines, which include art and design, education and pedagogy and psychology, specifically related to the imagination and creativity in children. Therefore, the review of the literature will reflect these areas.

## **2.2 Art and Design**

According to Duvall (2014) is that art asks questions while design answers questions, design is about fulfilling a need and art does not fill a need apart from the need to exist and challenge the viewer. Similarly, Campbell (2013) says that design is solution –driven and art is experience-driven, more specifically that art comes from our own internal and external experiences and is a projection of that experience and design is about finding a solution to a problem.

This is not to say that art is not important because it is very much part of human culture and inspires wonder and awe, in contrast design is not interested in this, although being in awe of design is a bonus it is not the real intention because design is about making peoples' lives easier (Duvall, 2014).

According to Campbell (2013) art is about internal constraints and design is about external constraints and provides an example of art, something that comes from self-imposed constraints, as someone who may be interested in owls or Lithuanian mythology and asks themselves what they can create, whereas a designer may be interested in Italian coffee shop culture and how that can be replicated in Northern America to make lots of money.

Art does not have a set process and there are no rules this has been evidenced by the fact that anything can be art including a tree or a dog (Duvall, 2014). However, there are rules in design because even if a design is considered ugly there still exists an underlying structure that solves a particular problem and the rules of design include the rules of composition, the colour and what the design is intended to do or what problem it is intended to resolve (Duvall, 2014).

Danto (2013) refers to the very early understanding of art by Plato who said that art was imitation, in other words it looks like the real thing but it is not the real thing. However, Danto (2013) in the attempt to answer the question ‘ what is art?’ reject this idea and says that there is too much art that is certainly not imitational and that some art belongs to the imitational and some does not belong to the imitational.

Modernism brought with it a new understanding of art, Marcel Duchamp found a way to eradicate beauty in 1915 and Andy Warhol in the 1960s showed that art could resemble a real thing and the art movements of Pop art, Fluxus, Conceptual Art and Minimalism which brought about art that was not exactly imitation (Danto, 2013). During the 1970s photography and sculpture shifted the centre of what was considered artistic self-awareness, and since that time anything was considered feasible to be art, in other words anything goes and it was therefore difficult to define art because anything could be considered art (Danto, 2013).

Banks (2005) addresses the question of what design is by going back to prehistory and claims that design has always been part of human activity and is a process of creativity where forms come into being.

## **2.3 Art and the Psychology of the Child**

According to Barnes (1987), children's early art is a language, which actually describes their world by using shapes and symbols, and although these symbols seem poor to adults, they are unique to the child who drew them. Matthews (1999) states that although it may be possible for adults to recognise a good visual representation, this is more difficult for children because they have very different ideas about what a good visual representation is. As well as their ideas being different, they are always changing continuously as they develop, so it is not clear what children's priorities are when they are producing representations, interestingly, in his study Matthews (1999) also found that the above-mentioned findings are universal across cultures.

According to Arnheim (1998), art that is produced by children is as varied as that of adults, and although there are some similarities between children, each child produces unique art. Moreover, Arnheim (1998) also says the differences in art between children are due to a number of influences including the child's stage of development, temperament, the environment and the talent of the child. Einarsdottir et al. (2009) suggests other influences that include the availability of materials and resources and social and cultural factors. Moreover, according to Rose et al. (2006) it is important when considering children's drawings to look at the context where the drawing takes place in relation to the practices of adults such as teachers and parents, as well as children themselves, which also have an effect on children's drawing, rather than simply considering how drawing changes with age.

Einarsdottir et al. (2009) looks at how children's perspectives can be understood through engaging them in drawing, and importantly suggests that much of the understanding of children's drawing is based on ideas about artistic development, however, more recently there has been a move away from this towards understanding children's drawings as expressions of meaning. Einarsdottir et al. (2009) explains that this focus, i.e. drawing as creation of meaning, moves away from the idea that drawing is about representation towards understanding children's intentions through their drawings.



## 2.4 Creativity

There have been different explanations of the construct of creativity which have included a focus on personality as the main characteristic and the reorganisation of elements of a problem in problem perception (Almeida et al., 2008). Even though there are many different ideas about creativity and there is difficulty in reaching a consensus, it is clear that creativity is reflective of certain style or personality standards; therefore, it is possible to consider personality in understanding creativity which includes an open mind, novelty, tolerance to ambiguity in addition to cognitive aspects such as thinking flexibility.

Other understanding of creativity includes the generation of a new idea, inventing something original, elaboration or improving products that already exist, moreover, originality and novelty includes flexibility, fluidity, elaboration and originality, and these are the same characteristics that are considered by Torrance in his theories and also in the development of his Torrance Thinking Creative Test (TTCT) (Almeida et al., 2008).

In reference to the difference between innovation and creativity, Rhodes (1961, p.309) said the following: *'history proves that great inventions are never, and great discoveries seldom, the work of any one mind. Every great invention is either an aggregate of minor inventions or the final step of the progression'*

Morais et al. (2009) focus on the cognitive aspect of creativity, however, this is an approach to creativity that focusses on problem solving, and their study focuses on specific cognitive functions that contribute to creative performance. There have been a number of different cognitive dimensions that have been considered by psychologists which include fluency, flexibility, originality and collaboration which have been used to define creativity (Almeida et al., 2008). Almeida and Prieto (2007) present a definition of creativity that includes the cognitive aspects such as the fact that creativity is more associated with divergent thinking rather than creative thinking, is an individual attribute rather than something that is a universal construct, it is something that comes from insight and novelty instead of simply learning and everyday behavior and is better characterised by problem finding rather than problem solving. Runco (2003) brings attention to the fact that cognitive theories place an emphasis on knowledge structures and intellectual processes which allow a person to produce original ideas which is thought to be indicative of creative potential.

However, cognition is almost never concrete and therefore, cognitive scientists have to depend on inference, thus cognition is a difficult and challenging target to achieve (Runco, 2003). Non-cognitive factors of creativity such as personal and social factors have been considered in creative production. Moreover, Amabile (1983) focusses on the role that the environment, the person and intrinsic motivation play (Almeida et al., 2008).

In reference to testing creativity, Cropley and Roeper (2000) offers a comprehensive presentation of creativity tests and says that some creativity tests measure cognitive processes which includes divergent thinking and the construction and combination of categories, non-cognitive aspects of creativity fall under motivation and include impulsiveness, risk taking and novelty, and other non-cognitive aspects include facilitatory personal properties such as independence and flexibility and a positive attitudes to things that are different. These tests have a reasonable level of correlation with criteria of creativity which includes ratings by teachers. Cropley and Roeper (2000) bring attention to the fact that such tests are a good indicator of potential creativity because there are other factors such as skills and knowledge that are needed for creative achievement which these creative tests do not measure.

Plucker (1998) says that work on creativity is based on psychometric testing or have been developed in response to weaknesses of ways of measuring creativity. Although there has been a diverse set of assessment techniques that have emerged and thoughts about creativity have moved away from psychometric perspectives, Plucker (1998) says that most current work on creativity are based on methodologies that are psychometric in nature, therefore, psychometric studies on creativity have been the foundation of current understanding of creativity.

It is important to understand that there is a difference between the need to develop creativity and the idea that there are individuals who are naturally gifted. Creative development is very much influenced by the environment and upbringing of a child as well as being something that is inherent. In contrast the idea of giftedness refers to those individuals who have a creative ability which is above average (Esquivel and Hodes, 2003) and more specifically, giftedness is something that represents potential and the main variable is the creativity (Esquivel and Hodes, 2003). The main difference between the two is that being gifted is seen as something that has been given to a child as opposed to the idea of developing something through effort (Esquivel and Hodes, 2003). In reference to this idea Moustakas (1977) says the following ‘Creativity is a turning point awakened in times of challenge or crisis, involving an unknown or unpredictable path, in which there is a particular focus, concentration, exertion, or unfolding as the individual shapes new ways of being and becoming, as the individual engages in new actions and creates new life’ (Esquivel and Hodes, 2003 p. 136, 137).

### **2.4.1 Education and Creativity**

Runco (2014) looks at the educational perspective of creativity, which includes the classroom environment and the teacher.

There are a number different ways that teachers can support creative talents through their attitudes and actions (Runco, 2014). One way is that students tend to imitate teachers or another way is through discussing alternatives as suggestions, this is referred to as valuation (Runco, 2014), however, another way that a teacher can support creativity is through evaluation or criticism, although this should be offered very carefully.

Much of the literature that is related to the role of the teacher in creativity refers to the motivational aspects in the relationship between the teacher and the child. It has been suggested by Plato that creative writing comes from listening and being inspired by other creative writer, and there is evidence to suggest that the attitudes, beliefs, perceptions and behaviours of teachers has an impact on the intrinsic creativity in children because the teacher can be an important model of intrinsic motivation (Tighe, Picariello and Amabile, 2003).

Runco (2014) brings attention to the unconditional positive regard theory by Carl Rogers which links spontaneity to creativity which is based on the idea that if an individual believes that they are sincerely appreciated and respected then they will be creative. In the classroom this would mean unconditional positive regard by teachers which would lead to creativity.

If teachers believe in student autonomy then it is often the case that their students are curious, have a desire to master their work independently and have a preference for challenging work, moreover, if there is a perception by the teachers that children are intrinsically motivated then the children will actually be more intrinsically motivated and will see themselves as being more competent (Tighe, Picariello and Amabile, 2003). Additionally, there is also evidence that where teachers help their students to learn how to be creative, in this case solving puzzles, and where there is no pressure to perform, children tend to perform very well in terms of creativity (Tighe, Picariello and Amabile, 2003).

The attributes of teachers that have been shown to increase creativity in children include being interested in children, being likeable, satisfied, courteous, professional and enthusiastic, in other words it is important to understand that not only do teachers impart knowledge and teach children skills, but through their own attributes and beliefs they can actually inspire children as well (Tighe, Picariello and Amabile, 2003).

Further evidence of the importance of the role of the teacher in relation to motivating creativity in children is that in the 1970s there was a change in the classroom from the traditional to the open. This was designed to minimise the extrinsic constraints on motivation by removing them from the classroom, however, this also required the development of intrinsic role models, i.e. teachers, who could inspire children because these teachers themselves are intrinsically motivated (Tighe, Picariello and Amabile, 2003).

However, in contrast to the idea that teachers perform a motivating role in children's creativity there are ideas that the teacher can play constraining role in terms of creativity. In reference to ideas that are related

to potential constraints on creativity in the classroom (Gardner, 1990, Meador, 1992, Burkitt et al, 2010, Roth 1996) which include the teacher's evaluation in being very important in achieving grades, the restriction of materials by the teacher and the restriction by the teacher of not allowing the child to verbally express their inspirations in the classroom, it is important to note that these constraints are not the result of classroom structure, but rather are the result of practices and attitudes of the teacher (Tighe, Picariello and Amabile, 2003).

In reference to inhibitors of creativity Runco (2014 p.183) also suggests that teacher should avoid using 'squelchers' which are expressions which can inhibit creativity and include sayings such as 'You've got to be serious!', 'Too risky!', 'Can't be done.' and 'that's a waste of time!' (Davis 1999). Teachers should avoid the use of reward such as grades and gold stars because they are extrinsic motivators whereas creativity comes from intrinsic motivation where there is less need to please the teacher, otherwise students will be more interested in what the teachers wants and less interested in self-expression (Runco, 2014). Additional inhibitors of creativity mentioned by Runco (2014) rules, policies, traditions, procedures and regulations; because they are related to habit they do not promote creativity.

In reference to the role of the teacher Runco (2014) says that teachers with more experience have more biased views about creativity, however, the idea of creativity was associated with personal, cognitive and environmental components. A criticism that Runco (2014) has of teacher's perspective of creativity is that they tend to favour the use of portfolios, however, this approach can penalise students who need the most help who may have the potential to be creative back lacked the required skills to complete products.

## **2.5 The Child's Imagination and Creativity**

In relation to the creation of art, Fuchs Holzer (2009) states that imagination is a partner required for creativity and it is not possible to teach children to be creative without being educated for imagination. This is not to say, however, that imagination is not a capacity of children when they are being creative; it just means that imagination is very complex as a process and should be explored in depth before being connected to creativity. The basic idea behind Fuchs Holzer's (2009) work is that in order to discover and create new possibilities children should wonder and be curious about things. In other words, to bring the possibility into the world, there must be an image of it in the mind; this is the imagination and the way that this inward image is manifested to the outside world is through creativity; therefore, before you learn to create you should learn to imagine (Fuchs Holzer's, 2009).

The work of Cohen and MacKeith (1991) looks at the imaginings of children and the world of make-believe; they look at a number of imaginary worlds of children and study the numerous factors that influence them.

There are various influences that include storybooks, toys, adults in children's lives, older siblings, stories told by others, visiting places, medical conditions and holiday experiences.

A well-known theorist named Vygotsky, who examined imagination and creativity in childhood, also suggests the idea that the imagination is related to reality. Vygotsky (2004) says that imagination is connected with reality because imagination is based on ideas that are taken from reality, in other words a person's creative ability depends on their experiences and the variety of those experiences. In relation to this idea, Vygotsky (2004) says that there are two types of behavior in a person. Firstly, reproductive behavior, which is reproducing previously developed behavior patterns or resurrecting previous impressions. Secondly, and more relevant to this study, is creative activity which is not merely reproducing impressions, but is the creation of new images from the imagination that do not exist, for example, what the future will be like, in other words it is not about the brain retrieving what it has stored but about the brain creatively reworking this past experience (Vygotsky, 2004).

Alternatively, Cohen and MacKeith (1991) say that the character of the child may have an effect on whether the child has an active imagination; in their study, participants described themselves as imaginative, bright, dreamy and bad at games and most of them had a happy childhood. Importantly, these children needed a certain amount of leisure and comfort in order to develop their imaginary worlds and they were often shared with other children (Cohen and MacKeith, 1991).

Moreover, in relation to creativity, an important dimension has been put forward by Fuchs Holzer (2009), who states that it is in fact very important for teachers to understand the concepts of imagination and creativity and they must also learn how to foster the imagination.

One of the ways that we can conceptualise creativity is an attribution approach that has been proposed by Amabile (1995) where it is important to ask three questions about creativity which are *what*, *where* and *why* questions. The first question is 'what is creativity?' and Amabile (1995) provides two possible approaches to this question, the first is from the dispositional perspective which says that creativity is a quality of a person, personality trait and personal style, the second approach is that there are strong social influences on creativity, if we accept this idea it is important to reject the person-centered definition. This perspective says that creativity is a quality of ideas or products ascertained through social judgment, and creativity can be explained through the characteristics of a person their situation and the interaction between the two (Amabile, 1995). Moreover, this approach helps to understand where creativity is located, in contrast to the dispositional approach which says that creativity is a quality that is a part of certain creative geniuses and that a person either has creative ability or they do not. If this dispositional perspective is taken too far then we will be only concerned with the work of individuals known for their creativity (Amabile, 1995). In reference to the

question of *why* Amabile (1995) says that this is best answered through a social-situational approach that considers independent variables that are manipulated or controlled, and creativity should be measured through consensual judgments of products made by participants (Amabile, 1995). This is in contrast to the personality cognitive type research, which uses paper-and-pencil tests to derive personal cognitive style or ways to measure creativity, or both (Amabile, 1995). Overall, the dispositional approach is narrow and limits the understanding of creativity (Amabile, 1995).

Support for the idea of the attribution perspective of creativity is presented by Kasof (1995) who opposes the idea of the dispositional approach in favour of the situational (attributional) approach. Kasof (1995) criticises the idea that research into creativity focuses on personality and cognitive psychology seeking the characteristics of those who are creative, and neglecting external influences on creativity (Kasof, 1995). Kasof (1995) argues that the research into creativity is skewed and that the majority of studies focus on the dispositional approach, the reason for this has been the fact that creativity is more strongly influenced by a creator's disposition. There are good reasons to doubt that ability, personality traits and cognitive styles have more of an influence on creativity than social-structural, cultural, technological, economic, political and environmental factors, therefore, a better explanation of creativity would explain a variation in creativity across individuals, situations and time (Kasof, 1995).

In a study by Kasof et al. (2007) it was found that value types can foster creativity and also inhibited by value types and creative performance can be promoted by a synergy between self-direction value type and intrinsic motivation orientation.

In the investigation of creative processes and insights into the personality, researchers have used creative products, this is based on the premise that creativity is a distributed set of traits and that products reflect this unique creativity (Besemer, 1998).

Although there has been much written about the imagination of the child and that whatever is produced is pure art, there is a very strong argument that in order for a child to be artistically creativity they need the required skills. Chan and Zhou (2010) say that there is a link between drawing skills and artistic creativity, this was found to be true for all age groups. Chan and Zhou (2010) say that technical skill is required for artistic performance and they quote Vinacke (1952) who says that it doesn't matter how original or valuable a creative idea might be, it would require the originator to have the required skills to convert it into something that is tangible.

## 2.6 Pure Art

In relation to judging or evaluating children's art and design ability, judgment can be made against whether or not the art shows specific and taught artistic skills or other judgment methods such as representation. However, there are those (Cizek 1936, Viola, 1942, Dubuffet 2003) who believe that whatever a child produces is valued, a pure representation of the child's imagination and that such ability of children is tainted by pedagogical approaches to teaching art and design.

This idea was first put forward by Franz Cizek who is credited at being the first to discover that children's drawings are governed by 'unconscious, innate "laws of form" (Wilson and Wilson, 2009 p.43) that there are universal rules that all children have regardless of their environment and upbringing. Indeed, this understanding, those children have a 'universal language of visual symbols' (Wilson and Wilson, 2009 p. 44) that is inherent in the child from birth and needs to grow or develop over time and needs to be protected from the interference.

Franz Cizek is credited with being the first to discover Child Art and he did not believe in a set way of teaching, rather he believed in minimal involvement as a way of fostering self-expression and nurturing creative tendencies through free exploration with a wide choice of materials (Viola, 1942). Moreover, Cizek valued children's art considering it pure and he endeavoured to create a conducive environment for the children to create in (Viola, 1942).

Cizek is also credited with discovering that children from around the world, with different cultural backgrounds and upbringing, have regularities and similarities in their drawing. In relation to this idea, Wilson and Wilson (2009 p.52) say that a child's drawing is determined by 'an innate set of graphic-ordering principles' and what they draw comes naturally. Wilson and Wilson (2009) also say that this universal language of visual symbolism is associated with a prohibition against interfering with the natural course of children's development, and that such interference can adversely and irrecoverably affect his development. An example of this is the classic 'tadpole person' (Figure 2-1) which has a recognisable form that children draw in the early stages of development; this form appeared to come from within the child and is not influenced by external factors (Wilson and Wilson, 2009).

Figure 2-1 Tadpole Person. Source: Wilson and Wilson (2009)



However, Wilson and Wilson (2009) are against a completely hands-off approach, they say that by not being involved in the child's development is detrimental to the child. Wilson and Wilson (2009) cite the example of a child who has a problem reaching their desired goal and nonintervention will not allow them reach this goal which could impede development.

Another advocate of pure art is Jean Dubuffet. Dubuffet was an artist who was against the cultural position and looked for new art forms that were far from official production (Dubuffet Foundation, 2013). He was fascinated by the art of children and coined the phrase '*art brut*', which means raw art, and he liked to emulate this crude and violent energy in his own art (Dubuffet.com, 2003). Dubuffet himself provided a definition of this *art brut* which included the following: '*we mean pieces of work executed by people untouched by artistic culture, in which therefore mimicry, contrary to what happens in intellectuals, plays little or no part, so that their authors draw everything.... from their own depths and not from clichés of classical art or art that is fashionable. Here we are witnessing an artistic operation that is completely pure, raw, reinvented in all its phases by its author, based solely on his own impulses*' Jean DuBuffet. (1949).

There is much support for the idea of leaving children to produce art independently, and that such art is valued for its purity in some of the suggested approaches to participatory design. This idea also relates to the idea that creativity should be democratic whereby creativity is something for everybody as opposed to the elite understanding of creativity where only a few have creativity ability, this approach was found to be the best way of viewing creativity in education (Robin Report, 1999 cited in Sharp, 2004 p.6). Jackson (2009 p.259) advocated that children to create their own original ideas and those children have the '*capacity for infinite acts of creativity*'. McArdle (2002), in writing about the Nurture Nature approach to participatory design, says that artwork produced through this approach is valuable because it allows freedom for self-expression, as well as being beautiful, unique and spontaneous and Cassou (2004) say that self-expression and pure creativity go hand-in-hand.



In further support of these ideas Pufall and Pesonen (2000) criticize the idea of having a system to judge or analyse art using analytical dimensions because it does not answer the question of how or why art is done and it is also limited when judging art of different cultures and why art is considered to be beautiful in different cultures.

## **2.7 Artistic Development**

In a study by Mara (2009), it was found that when children get older they can make better critical judgments and can give meanings to paintings. This study was designed to help teachers to understand when children in three different age groups change their patterns of reasoning so that they can intervene in the children's art learning and help them to have a more complex understanding of art. The idea of children's perception of art changing as they grow older is supported by Gardner (1990), who states that the two-year-old sees the world the same way as a sixty-year-old, although seeing the same is not as important as knowing what should be noticed.

There is evidence that artistic ability also changes or improves with age, however, there is a reported drop in creativity around the age of 12 or 13 where the child is in the process of shifting between cognitive levels, and it is at this point where the adolescent is capable of hypothesizing, making predictions, imagination and making combinatorial analyses themselves (Esquivel and Hodes, 2003).

Gardner (1990) stated that when children were asked to group together pieces of art as an exercise they tend to group them according to the subject matter and they are not able to group the art together according to texture and composition which may be characteristic of an artist's work. In fact, it was found that only pre-adolescents had the ability to independently ignore subject matter and were more sensitive to the style. However, Gardner (1990) also cites a study called Project Zero, which found that if the subject matter was not present, even six-year-olds could be sensitive to the style the same as the adolescents. Moreover, the study found that when the subject matter was present it could be easily overcome.

According to Lowenfield and Brittain (1982) there are six stages of artistic development. If we look at the later stages of artistic development which includes children aged between 7 and 9, and 10 and 13 years respectively, it is clear that children try to make their work more realistic and they are more critical of their own work and judge it against this realism.

In addition to the idea of children trying to make their drawings more realistic, there is also the idea that children demonstrate that they follow particular schema. Fordon (1998) says that children develop schemas for drawing; one example of this is when children show a common representation of the human figure when

they are aged four, for example the tadpole, which has been presented by Wilson and Wilson (2009). This idea is also supported by the six-stage model that is presented by Lowenfield and Brittain (1982) where it is shown that children follow schema up until they are about six years of age.

However, there has been criticism of the idea that children follow a linear progression in their artistic development. Fawson (2009) says that more recently the ideas from developmental stage theories have been challenged resulting in divergent thinking around stage theory. The main argument behind Fawson's (2009) idea is that drawing development is not linear and is not tightly related to age, more specifically, Fawson (2009) says that development is not only based on biological factors but is also influenced social-cultural factors, ideas of drawing development are based on Western ideas and do not consider other cultures, graphicacy alone is not enough to measure artistic development because children can develop artistically in other ways such as through different two- and three-dimensional media, drawing should not be judged by the end result because the process is also important and finally, children may move forwards or backwards between the stages of artistically development which is not supported by the idea of linear stages (Fawson, 2009).

Much of literature that is about artistic development focuses on the techniques that are acquired as children get older and also focuses on aspects of the art that are learnt and show signs being taught. For example, Fordon (1998) talks about the artistic development of children in terms of the recognisable schema, which begin, with scribbles leading onto the 'tadpole' drawing of people to more realistic representations of people and things. Another example is the work of Milbrath (1998 cited in Golomb, 2000) who focuses on the different drawing competence at different ages.

Pufall and Pesonen (2000 p.81) say that children's artistic development is sustained in an 'art world' which is a *'symbolic reality constrained by social valuing of art and opportunities to do art, as well as children's personal themes and representational skills that change systematically over development and with experience'*. From this it is clear that there are different influences on the child in their artistic development which include that found in the environment such as social values and from within the child themselves which includes the children's personal themes and representational skills.

Development is referred to in terms of development of creative ability, which changes, as children get older. Rostan (1997) says that the components of creativity include knowledge, motivation, ideation, evaluation, problem finding, age and context. Rostan (1997) says that children have to have the required skills in order to be creative and says that an increase in levels of technical expertise leads should increase creativity in children if those children are motivated to develop and improve those skills.

Rostan (1997) when discussing the issue of the relationship between age and assessing creativity brings attention to the fact that according to the literature there is a progression in artistic development. A young child loses their facility with graphic symbolisation as they get older, as they reach middle childhood then there is what Rostan (1997 p.188) describes as an ‘inhibiting’ focus on realistic renderings followed by ‘literal stage’ where there are attempts to replicate physical reality or to reproduce stereotypes or popular images.

## **2.8 Children, Art and Education**

Gibson (2008) states that there is no doubt that children’s perspectives and opinions of art, their experiences of producing art and their attitude toward learning art should be very important to those who are involved in promoting art education. Furthermore, in Gibson’s (2008:p.177) study it was found that children have ‘rich, perceptive attitudes as to the meaning, value and purpose of art in their lives’.

According to Yarrow (2010), one of the best ways to generate more ideas from a child is to link image making with storytelling. Moreover, she states: ‘children have a beautiful and natural conception of art, even though it seems like a foreign language to adults’ Yarrow (2010:p.71). Furthermore, Gong and Levy (2009) investigated how to bring attention to words as they were read during storybook reading. They used animation to bring attention to each word and they found that bringing children’s attention to the print helps children to improve their letter reading and written language skills. However, it is important to remember to listen to children when interacting with them.

Bentley (2011) looks at ways to help the reluctant child artist to communicate. She states that it is important to listen to the children’s interests and then develop the curricula based on these collective and individual interests. Although Bentley (2011) found this approach to be supportive, stimulating and challenging for children and teachers, she still asks what can be done with a child who does not want to do art.

According to Herberholz (2011), it is possible to motivate children to transform their feelings, thoughts and perceptions into paintings and drawings by using a number of different methods. The following are some of these methods:

1. Changing the format – changing the size, shape or colour of the paper
2. Fantasy – encouraging children to imagine beyond reality, letting them be free and silly and think of make-believe situations
3. If I were – if I were a balloon man, the king, a robot, a helicopter pilot, a peacock, etc.

4. Catalogue clippings – cutting out part of things like wheels and faces and asking the children to complete the picture
5. Fanciful characters and make-believe animals – describing the characters, listing the characters, describing the action, saying where the action takes place.

(Herberholz, 2011).

Thomas (2010) suggests that there is a sociological rather than a psychological explanation behind creativity during the interaction between pupil and teacher. This means that when a teacher uses social tact it helps to bolster the pupil's quality of work and creativity and represses the teacher's pedagogical role. According to (Hofmann, 1998) a child should be stimulated in the pursuit of self-realisation in order to develop their innate abilities, instead of being estranged from these abilities, therefore, teacher and student should take a common starting point and the teacher should not dominate.

Just like the idea that adults are the ones who judge children's art, Gibson's (2008) study says that in researching children's attitude to art making we should look at the children's perspective rather than only hearing the researcher's voice or addressing the researcher's agenda. Gibson (2008) argues that much of the literature about art education is about the relationship between the student and the pupil and neglects the voice of the pupil, there is a real need to understand the pupils' thoughts and ideas about making art because they are the ones that will be affected by resulting pedagogies.

Adu-Agyem et al (2009) explored the value of art for enhancing children's learning and found that art facilitated the expression of experience and emotion. The reason for this is that learning is more effective when it is coupled with an emotional experience; therefore, learning can be effective in an art lesson. Moreover, Adu-Agyem et al (2009) found that art can be used as a form of therapy, which enhances children's psychological wellness and prepares them for learning.

## **2.9 Collaborative and Participatory Art and Design**

Participatory design generally operates where both the designer and user form a partnership within the design process, where the user will be actively involved in the design process, which will include brainstorming in order to generate ideas from the participants (Read et al., 2002).

The concept of participatory design comes from attempts to gain the tacit knowledge of users when developing new approaches. In this case, designers will meet with users to familiarise themselves with how they work and employ techniques to gain knowledge and then use this understanding in any subsequent development (Spinuzzi, 2005).

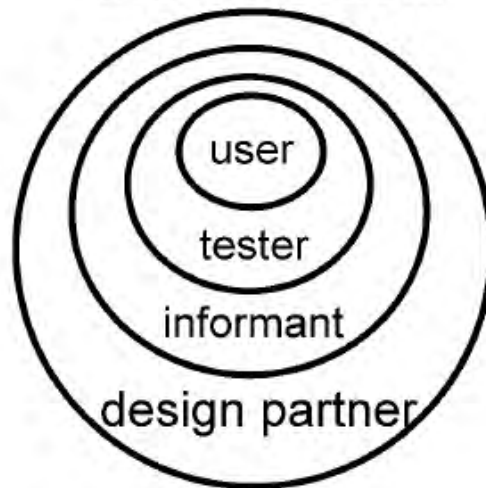
It is important to engage children in the creativity process. Gattenhof and Radvan (2009) discuss the importance of engagement models that respect the intelligence of children and avoid using clichés about children's creativity in the process of artistic production. Moreover, in relations to the arts Gattenhof and Radvan (2009) bring attention to the fact that the child is seen as more socially competent than in previous decades and that children can discern information more independently as a result of varied rather than uniform development.

Driskell (2002) in providing recommendation on how to create better cities with youth participation provides a list of what he considers to be participation, he said that a definition of children's participation includes: transparent, local, interactive, inclusive, responsive, relevant, educational, reflective, transformative, sustainable, voluntary and personal. Hart (1992) also provides a definition of what child participation means, he says that it is generally the process of sharing decisions, which affect the lives of people and the community within which they live. Moreover, Hart (1992) explains the idea of participation against ideas about democracy, that child participation builds democracy and is a right of citizenship.

Druin (2002) discusses the importance of allowing participating children to be involved in the design of technology intended for children, because as a group they have their own norms, culture and complexities. Taxen et al. (2001) present a new design methodology which involves a large number of children in the design process for a new software project: here the adult is responsible for the evaluation of ideas generated by children in relation to the aims of the programme.

It is important to understand that there are varying degrees of child participation in participatory design. According to Read et al. (2002) participatory design includes informant design, which involves the child informing the adult about their needs, balanced design, where there is equal participation of the child and adult, and facilitated design, where the child designs and the adult is merely the facilitator. These ideas are similar to a model presented by Druin (2002), which shows that a child has four roles in the design of new technologies, which include design partner, informant, tester and user (Figure 2-2).

Figure 2-2 Druin Roles



Read et al. (2002) maintain that this type of participation changes as children become more involved, from informant design as described above, to balanced design where there is an equal partnership, where both are involved in the design process.

Among the main reasons provided in the literature about the need to involve children in creating their environments are that children bring fresh perspectives and they are the users so they know what they want (Driskell, 2002, Day et al., 2011). In a study by Day et al. (2011) about research into including children in planning and regeneration it was found that children can play a significant role in the process, and they suggest that there is a need for evidence-based studies about the longer-term impacts of involving children in participation.

It is clear from the literature that many focus on participation of the child, where children are involved in planning and design they are given the opportunity to participate directly. In a study by Sarkissian (2006) about involving children in design, it talks about allowing children to give feedback to ensure that their ideas are incorporated into the design and also to involve them in the assessment and evaluation of the design, here it is clear that the meaning of participatory design takes the child further into the design process.

Day et al. (2011) make a case for child participation that includes a competency argument and an outcome argument. The former argument says that it has been shown, both in academic studies and real life situations, that children, even young children, are perfectly capable of being creative and using the required tools for designing outdoor spaces and also schools, however, the authors do state that this is with the appropriate support from adults. The latter argument says that children are best for designing environments that will help to benefit them cognitively; here the authors bring attention to the idea of the need to include children in designing spaces that will be used by children.

In relation to the above it is important that children are engaged in participatory design especially in cases where the product is designed to be used by children. In a study by Madani et al. (2013) children were involved in the design of a children's remote control and their input was necessary not only in terms of practical requirements and ergonomic testing but they also provided the inspiration for the design concept itself. The reason that participatory design and user-centered design in relation to children is so interesting is because children and adults are so different (Moraveji et al. 2007).

Another area where it has been suggested that collaboration between teacher and child is beneficial is that Angelides and Michaelidou (2009) suggest that children's drawing can show us if they have any problems in school in relation to social and academic marginalisation. Moreover, if there is collaboration between the teacher and the child when making the art, this can reduce marginalisation. Angelides and Michaelidou (2009) also found that children who were involved in collaborative art making were also better at forming relationships in groups.

The literature here has shown that children's involvement is either necessary or beneficial in designing objects or spaces intended for children. Woolner (2011) agrees that participatory design is necessary; however, Woolner (2011) also says it is not a straightforward matter because the adult is bound by certain restrictions in designing and planning and therefore, there has to be compromises in the participatory design process.

It has been suggested by Hart (1992) that there is disagreement about the extent to which children should participate in design. Some have very strong opinions that children are the saviours of society and others say that there is naivety in allowed children to participate because they do not possess the decision making abilities of adults and that it is unreasonable to make children responsible at a young age.

The arguments about the extent to which a child should be involved in the participatory design process include that which has been written about the idea that children do have only a minimal role. One of the main criticisms from the literature about participatory design with children is that children have a minimal role in the design process, which would mean that their involvement is only token and the input of their design ideas minimal. There is criticism in the literature that participation in design projects have the right intention, however, in practice the outcome is different. Wake (2007) says that although projects are well intentioned they do not allow children to participate beyond mere consultation. More specifically, problems lie in the fact that because there is only consultation the design outcomes may only be adult interpretations and there is no reflective process. The danger here is that what children want in terms of design for objects and spaces intended for them is very different from the ideas of adults, this will result in designs that are not accepted by children (Wake 2007).

This idea is echoed by Hart (1992) who says that although there are many projects that are set up by adults to involve children, children merely act out predetermined roles, however, this may be harmless but the real issue is when children's involvement is manipulated.

Similarly, Day et al. (2011) says there is a risk that children are simply consulted to present their ideas but are not involved in the actual planning process which means that the ideas could be misappropriated or ignored, thus leading to non-participation. This non-participation has been blamed on the fact that there is low awareness among professionals of child competence and ineffective methods for supporting child participation (Day et al., 2011).

Read et al. (2002) also say that when children work with adults in participatory design they tend to demur to those adults, even if the children have more knowledge about the subject. However, children are often not given the opportunity to express their opinions and be taken seriously by adults (Druin, 2005).

However, there are arguments that provide a justification for a lesser role of children. It is important to remember that the role of children in designing products for children has been limited because children are occupied by attending school, and they are subject to the power structures, assumptions and biases that exist between adults and children (Druin, 2002). Moreover, collaborative design particularly needs to involve adults regarding the design of technology that is going to be used by children, as it is they who have gained the skills and knowledge required to manipulate technology. Much of the work in this area (Druin, 2002; Drum 2005, Read et al., 2002 and Taxen et al., 2001) is about participatory design of media technology for children and it is clear that adult involvement is unavoidable here.

In addition to the issue of the limited role played by children in participatory design, other problems arise from this relationship. It has been suggested by Taxen et al. (2001) that a power structure between the adult and the child that has to be negotiated because neither party is completely in control of the design process, this is difficult, especially in a school environment where a power structure already exists. Taxen et al. (2001) also suggests that children may be uncomfortable working directly with adults and unable to provide critical feedback; in fact it has been proven that it takes a long time to establish the child-adult partnership and adults cannot cope with more than three children at once.

Furthermore, in participatory design the goals of the project itself can be in conflict with the goals of the children and it is here that the adult may take the lead (Taxen et al., 2001). The problem is that children have less influence. In fact in Taxen et al.'s study (2001) it was felt that not all implementations by adults were interesting to children and they questioned whether it was preferable to involve them more by way of, for



example, voting on ideas, and they felt this needed consideration in future study to increase the influence of children on the design.

Moraveji et al. (2007) do say that participatory design with children requires that children are precocious or highly expressive, and if this type of child cannot be found, then a method can be employed to train the child during a long relationship. However, there are two problems with this idea, first; looking for highly expressive or precocious children goes against the idea that pure art or design ideas from the imagination of the child is something that cannot be judged, why is it the case that only a certain type of personality is required for participation? Second, the training method, which requires a long period of time with an adult, is extremely influencing on the child.

McArdle (2002) advocated an approach that allowed freedom of self-expression and spontaneity. Franz Cizek believed that allowing freedom fostered self-expression and Cassou (2004) said that self-expression and pure creativity go hand in hand. Similarly, spontaneity of creative self-expression is encouraged by Drew and Rankin (2004). Druin (2005) says that children are not allowed to express their opinions and are not taken seriously by adults.

Kristensen (2004) advocated that children should understand what they are actually making; there should be a real connection between the final product and their design, otherwise there is a risk that the children will not understand what they are actually producing, this is based on the ideas within the embodied cognitive theory (Clark, 1997).

Jackson (2009) said that children's independent creativity should be encouraged in order to create original ideas and that teachers should stand aside and Cassou (2004) say that children should be self-reliant throughout the design process, all of which is based on the principle that children are naturally creative and innovative.

Participatory design approaches clearly show that supervision and observation are strong adult influences, Pound (2011) and McArdle (2001) suggesting observing children during the creative process. Craft (2001) says that creativity may be impeded where there is over-supervision and Gable (2000) says that being observed by adults while engaged in creative processes can impede creativity.

Gardner (1990 p.ix) argued that classroom learning and the 'correct schema' of the art classroom impede the ability to create in an alternative way and influence the style of art. Kano and Read (2005) say that the agenda of the design process impacts on design outcomes. Similarly, McArdle (2001) says that learning experiences should be unstructured.

Many of the principles of participatory design in the literature here can be found in the work put forward by Dubuffet and Franz Cizek who both believed in the untainted purity of child art. According to Dubuffet it is very important that those engaged in art should not be tainted by artistic culture and that imitation should not have no role in the way an artist draws which includes the subject, choice of materials, the creative process itself and the ways that ideas are expressed (Dubuffet Foundation, 2013). Therefore, these ideas support a non-interventionist approach.

Specifically, in relation to not giving instructions, Dubuffet emphasises that the subject should not come from convention, thus it was decided that the medium through which the subject is provided, i.e. instructions, should be kept to an absolute minimum (Dubuffet Foundation, 2013).

As mentioned in the literature review, Franz Cizek believed that there should be no interference from the teacher, that the child should be left to be creative, within his approach there are two main inputs from the teacher which were firstly, the provision of materials and secondly, the provision of a creative environment, there is no evidence from his approach that the teacher should make any suggestion (Viola, 1942).

## **2.10 Influence of Adult Involvement**

One of the principles of participatory design is that it refers to more than one type of individual in the collaborative design process (Read et al. 2002). By examining work in the area of participatory design, collaborative design, and informant design, it is possible to learn about the importance of child input and also the negative aspects of adult involvement (Read et al., 2002).

The involvement of adults can be an impediment to a child's ability to develop artistically. According to Gardner (1990 p.ix), classroom learning has an influence on the style of the art. He argues that although models of the 'correct schema' are found in the art classroom and in textbooks, there is no opportunity to create art in an alternative way. He provides an example of young students in China producing paintings using the same classic ink and brush method (Gardner, 1990). These ideas are suggested by Meador (1992) who says that it is possible that education can inhibit the development of creativity in children that may be attributed to being constrained by social conventions or experiences in school generally.

Children have their own tastes and needs which are often different to those of their teachers and parents, however new design for children is often made in consultation with parents and teachers rather than by consulting children directly which is possibly due to the 'all-knowing' adult and the 'all-learning' child where children are dependent on adults for everything (Druin, 2002 p.1, 2). This issue is clearly identified in a study

by Durkin (2002) where she says that the design of powered mobility for children is adult-led and thus does not properly consider the needs of the child user.

Adults also have preconceived ideas about what children want because they were once children themselves. However, what they think about children's needs may be very assumptive, which could lead to the design of products that are not appealing to children (Druin, 2002). Much of Druin's (2002) work is about the importance of involving children in the design process rather than about independent design by children, there is still some necessary adult involvement because it is about designing technology.

Work related to possibility thinking in children are central to creativity has shown that this creativity is enabled by the teacher standing back and allowing the child time and space (Craft et al., 2014). However, Read et al. (2002) says that having adults involved in the participatory design process with the intention of only facilitating the process, or a 'hands-off' approach does not work. It was found that just facilitation was impossible; adults inevitably had to become involved, as the process was more interactive and children expected more participation from the adults.

What is relevant here is that art making is no longer spontaneous, confidence is decreased at this age and failure to support pupils can lead to a low perception of their ability. This will affect their engagement in and motivation for producing art (Pavlou, 2006).

According to Burkitt et al. (2010) there have been few studies about the influence of parents and teachers on children's drawing, and it was the intention of their study to find out how the practices and attitudes of these adults shape the drawing experiences of children. In their study (Burkitt et al., 2010) younger children tended to overestimate their artistic ability but as they get older and are able to perceive their ability more accurately, children enjoy drawing despite an environment of criticism and the curriculum. Teachers perceive the development of skills to be the most important aim of the curriculum followed equally by experience with materials and developing creativity, and parents also considered creativity and the imagination to be less important than expression and communication (Burkitt et al. 2010).

Burkitt et al. (2010 p.263) also discovered that children feel they get help from teachers in the form of 'graphical and spatial demonstrations' and verbal suggestions in the form of advice and tips, and that this was in contrast to being given specific instructions and shown what and how to draw. Overall, the whole idea behind Burkitt's et al. (2010) study was to look at the influence of parents and adults on children's drawing in educational and home settings and not to examine any negative effects of influence.

Roth (1996) also supports the idea that the teacher can influence the child in designing in three particular ways, firstly, by making suggestions about shapes and forms, secondly, hints about how existing designs can

be improved and thirdly, by setting constraints or restricting materials. It is interesting to note here that when discussing how these factors influence children, Roth (1996 p.144) suggests that such influences are unique to specific situations and that instructions, for example “design a bridge by using only a set of materials provided” (Roth, 1996 p.144) mean ‘different things in different contexts’.

The idea of adult influence is also supported by Einarsdottir et al. (2009) who say that provisions, interactions and support from adults influence children’s drawings and those drawings can be influenced by what other people do or say.

Some of the influences that have an effect on children’s drawing, raised by Rose et al. (2006) were the attitudes of teachers and parents towards drawing, what they thought the purpose of drawing was, and also the support that they provided to children.

Roth (1996) says that there are a number of factors that influence children's art and design, including tools, materials, standards in the community, current design, past achievements of the child, individual preferences and constraints set by teachers.

Another interesting issue raised by Rose et al. (2006) is that children value realistic drawings more and give less value to scribbles or expressive or abstract styles, and the reason for this is that they believe that is what adults value the most as well, which is a form of adult influence. More specifically, Rose et al. (2006, p.347) say that when teachers and parents support children they aim their support at creating ‘visually realistic’ drawings, providing the child with something to copy, encouragement or providing instruction often does this. This is a clear adult influence on the drawing process. However, it should be noted that despite the fact that younger children have more confidence in their drawing ability, they still desire more support from adults (Rose et al., 2006).

Moreover, adults themselves can be an impediment to the development of a child’s artistic abilities. According to Pesanelli (1991), children are at their most imaginative when they are creating settings for fantasy and play. The author provides an example of children defining their bedrooms in creative ways by moving furniture and pulling the bedclothes across the room to create settings for their fantasy play. Unfortunately, parents see this as messy and disruptive.

The parents have already decided what the children’s bedrooms will look like before they are born and they buy predictable products for them as they develop. By the time children reach Year 10 their creative ability has significantly declined. They spend their time in a bedroom, which has a standard design in a standard house, and they also spend their time in a school building, which is standardised according to rules (Pesanelli, 1991). This author goes on to say that this does not have to be the case because children’s environments

could be designed in a way that is interactive, adaptive and responsive; for example, a child's room could have moveable components to be rearranged every day. This is so that the child can overcome these rigid environments. It is the case that younger children are given more freedom in creating art. They are provided with the materials and although the art that is produced is of indifferent quality, there is a wide range of art that is produced, including abstract, imaginative and idiosyncratic art (Gardner, 1990).

The very presence of adults with children when they are carrying out tasks can have an influence on a child, whether they are explaining to the child the task or not. In a study by Fender and Crowley (2007) it was discovered that children who completed scientific tasks with adults who gave an explanation were more likely to approach the task conceptually rather than procedurally. The important issue in their study was that although there have been many studies that have examined the influence of adult explanation and presence in child problem solving, these studies have taken place in laboratory conditions working with individual children, Fender and Crowley (2007) argue that children often find themselves solving problems with adults in everyday settings, for example the home, where the parent exerts more control if the child is less competent and cede control where the child is more confident. Moreover, Fender and Crowley (2007) say that while there are many studies about guided participation in these settings, there is little known about how these interactions lead to specific cognitive changes in children.

Another interesting point raised by Fender and Crowley (2007) is that children learn through interaction with parents about the same topic, but in different settings, the example they provide is learning about dinosaurs which can take place in different settings such as the museum, drawing pictures or even during meals, and it is important to note that the nature of the parents' explanation may be different in these settings.

However, there are strong arguments for adult involvement in order to facilitate and support children in learning, and in particular it is important to understand that at some stage in a child's artistic development they will lose confidence in their own artistic ability and at this stage, at pre-adolescence, they require special intervention by the teacher to continue to be involved in art making (Pavlou, 2006).

There is an idea that creativity can be enhanced in children through intervention and stimulation, in an experiment by Garaigordobil (2006) graphic-figural creativity was enhanced by cooperative-creative play. More, specifically in Garaigordobil's (2006) study cooperative-creative play increased creativity in a number of ways which included originality and ideas that are statistically infrequent which were well presented and elaborated and also well-embellished with additional detail and creativity. In this experiment the intervention even improved the graphic-figural creativity of children who had a low ability in this respect, the outcomes in this study were assessed by experts who found there to be an improvement in the work, however, this is not to say that there is no adult influence in the work produced by these children, this is admitted by

Garaigordobil herself who admits that one of the limitations of the study is that the characteristics of the adults who supervise and observe the children during this intervention may have an influence on the effects of the program. A criticism of his study is that it claims that there is a close relationship between play and creativity that play is the first creative activity, however, play should be natural and in this case it is directed, controlled and monitored.

Freeman (1980) brings attention to the idea of minimal stimuli whereby children are allowed to draw what they want. However, the issue here is ‘minimal’ stimuli, which suggests that there is some influence. Freeman (1980) provides some minimal influence stimuli ideas and experimented with ideas, which included using simple shapes, a blank page, straight lines and circles. Nonetheless, if a child is presented with, for example, a line, they are thus told that they have to incorporate this line into their drawing, which can be considered a form of influence or coercion to a certain degree. In fact, Freeman (1980) gives some evidence that there is some level of influence from providing a child with stimuli. If a child was given a horizontal line as a stimuli it would provide a different response than if they were given a vertical line. Moreover, Freeman (1980) also says that children are very self-limiting in their strategies when they are given lines or shapes as stimuli.

Freeman (1980) said that when children are working with a blank page they bring different orientation and position biases; however, Freeman (1980) also says that there have not been reliable studies about the semantics of the blank page. Much of Freeman’s work is based on experiments with certain stimuli, e.g. lines on a page arranged in different ways, and how these stimuli affect the outcome of the drawing, in relation to this thesis, this is relevant because it shows that any kind of stimuli has significant and similar effects on the art that the child creates.

However, although the work of Freeman (1980) showed that stimuli affected the outcome of children’s drawings, in relation to the idea that some adult involvement is necessary there is another idea that in order to free a child’s imagination it is necessary to consider certain stimuli. Durham (2006, p.34) discusses the idea of ‘thinking keys and tools’ to unlock a child’s mind, these include stories, events, and objects to ‘tease and tantalise’ children to go after ideas and to unlock their minds (Durham, 2006 p.34). Some of the suggestions made by Durham (2006) very much involve adult input and are also very structured; even when the adult uses a ‘find the feelings’ approach the adult facilitates the whole process.

In a study by Ching-Yuan (2010) it was found that children’s expression of artistic ability improved through an experiment that aimed to find ways of enhancing this ability. The experiment used picture book appreciation discussions with children and found that artistic ability could be cultivated through instruction activities, which require adult involvement.

One theory that has been used to explain children's engagement and motivation in art is Achievement Goal Theory which says that goal orientations, such as performance goals i.e. showing ability, and mastery goals i.e. developing ability, are the reasons for engaging or avoiding tasks and can depend on perception of ability; moreover, these goal orientations can be context-sensitive, meaning that they are affected by classroom settings, practices and policies (Pavlou, 2006). In fact, engaging in art tasks is significantly affected by the task given by teachers and the pupil's perception of their own ability (Pavlou, 2006).

## **2.11 Ethnicity, Culture and Gender**

Using the Torrance Test for Creative Thinking (TTCT) a study by Bart et al. (2015) found that there was a statistically significant difference between boys and girls in terms of creativity in favour of girls. Tsai (2013) using the Consensual Assessment Technique (CAT) found that there were gender difference in creativity and that male adults excelled females in terms of creative performance. Karwowski et al. (2013) identified differences in personality traits between men and women and found that there were difference in these traits which were contributing factors to creativity. The educational level of a person is also important in whether or not gender has an effect on creativity, according to Matud et al. (2007) found that there were gender differences in creativity with a minimal dependence of educational level.

Although it may be the case that culture does not have an effect on the level of creativity in people, because it would unfair to say, for example, that Chinese people are more creative than Indian people, or to make comparisons (Runco, 2007) however, different cultures moderate the channelling of ability towards certain types of creative behaviour and creativity is a social cultural behaviour (Misra et al. 2006). A similar idea was put forward by Sawyer (2012) who says the domain in which a person is creative has shared conventions through which creativity is expressed. However, overall it would be difficult to measure levels of creativity between cultures, although they are different, any attempt at ranking different cultures in terms creativity ability would require criteria and standards which are likely not to apply to all cultures (Runco, 2007).

An example of where creativity may be different, as opposed to at different levels is that under geographical and cultural traditions necessity leads to certain skills which at one point would have been useful, but later become a talent that is expressed, an example of this is Eskimos who developed figural abilities due to the demands of hunting (Runco, 2007).

## **2.12 Conclusion**

Because of the nature of this study, the literature review involved a number of different areas, such as psychology and the imagination, design and pedagogy as well as literature related to participatory design and

children. It was revealed from the literature that there was a clear need to find a way to allow children to realise their imaginations in design, the evidence for this was firstly, adults are always involved with children when they are engaged in designing, and the literature highlighted the extent of this, secondly, such involvement has been shown to have influence on design outcomes, and thirdly, there has much been written about the merits of pure art that comes from the imagination of the child. In relation to this, the literature review was instrumental in bringing together these ideas that stemmed from different areas, i.e., education, design and psychology, and using these ideas to build the theoretical framework for the study. The literature also revealed that much has been written about pure art and that whatever a child produces is valuable, however, the review also served to highlight the gap in the research, specifically, that not much had been written about developing the practical ways that can help to achieved a child-led approach.

The literature has shown that design by children or design for children is always a participatory process involving adults, and while the literature recognises that there are varying levels and types of participation and also recognises the advantages and disadvantages of such participatory approaches, there is very little mention of a virtually non-participatory approach that recognises the design creativity of children. This study is not trying to argue against the merits of participatory design because in many cases it is necessary because children do not have the necessary skills and knowledge to build buildings or mechanical objects. However, by criticising participatory approaches we do highlight how adult influence can be negative or that the child's input is not fully reflected in the final design, which further supports the idea of non-participatory design. Importantly, the review showed that there are many different approaches in participatory design and it highlighted their limitations in terms of significant adult involvement and influence. This was even the case for those approaches, which acknowledged the importance of allowing children to be free and independent when they are engaged in design. However, such approaches did have some beneficial aspects that were considered or adopted in the study.

The literature has also revealed that there is a case that design by children is very different to that produced by adults if children are allowed complete freedom of expression, which has been supported by the arguments related to pure art.

The review has also revealed issues that are relevant to the practical implications of the experiment of this study, particularly in relation to adult involvement, duration, age groups, and the practical methods for creating designs.



## 3 PRIMARY RESEARCH CHAPTER THREE

### CONTENTS

3.1	INTRODUCTION.....	45
3.2	ENQUIRY PARADIGM.....	45
3.3	THE METHODOLOGICAL APPROACH.....	47
3.4	ADOPTED METHODOLOGY: PHENOMENOLOGY .....	48
3.5	ETHICAL CONSIDERATIONS.....	50
3.6	METHODS.....	51
3.7	CONCLUSION.....	76

### TABLES

TABLE 3-1	NECESSITY OF INVOLVEMENT IN DESIGN PROCESS ACTIVITIES.....	59
TABLE 3-2	CURRICULUM REQUIREMENTS AND STANDARDS CAN BEST ASSESS CREATIVITY .....	59
TABLE 3-3	DEPENDENCY OF CHILDREN.....	59
TABLE 3-4	AGREEMENT WITH INDEPENDENT WORKING LEADS TO MORE CREATIVE DESIGNS .....	60
TABLE 3-5	OPINION OF POSITIVE OR NEGATIVE INFLUENCE OF ASPECTS OF INVOLVEMENT .....	60
TABLE 3-6	TEACHERS' PERSONAL OPINION INDICATOR OF CREATIVITY.....	61
TABLE 3-7	OBSERVATION CHECKLIST OF STRUCTURE OF THE ART CLASS.....	71

### FIGURES

FIGURE 3-1	VENN METHODS .....	51
FIGURE 3-2	TRIANGULATION METHODS .....	53

### **3.1 Introduction**

This chapter presents the primary research of this study. The chapter will explain and justify the methodological approach and how the research methods were considered and designed. More specifically, the study adopts a qualitative phenomenological interpretative approach. Part of the process of deciding the appropriate methodological approach was to consider and reject other approaches which are also presented.

In addition to the analysis of secondary data, primary research is conducted using questionnaires that were distributed to the teachers, interviews and classroom observation. The main reason for conducting primary research was to establish incidences of involvement by teachers with children when drawing. Moreover, primary research also offers an insight into the structure of the class, which includes length of classes and the time allocated to each portion of the artistic process. Additional insight into class procedures is achieved through an analysis of curriculum documents.

A suitable methodology was required in order to achieve the aims and objectives of the research which include investigating the effect of factors of teacher involvement as influencing factors on creativity in children. However, these factors have first to be identified using a number of different methods which include questionnaires, interviews and observation presented in this chapter. These methods will reveal information about approaches to pedagogy and the role of the teacher.

### **3.2 Enquiry Paradigm**

Before the appropriate research methodology was chosen, it was important to first consider philosophies about research and choose one philosophy for our research paradigm. Therefore, the two main philosophical approaches to research, positivism and anti-positivism, will be considered.

#### **3.2.1 Positivism**

Approaches under this paradigm emphasise that experience can be understood by observation and experiment, which is a scientific approach (Dash, 2005). However, where positivism fails is when it is applied to the study of human behaviour and social phenomena which is far too complex and contrasts with the order of the natural world (Cohen et al., 2011). Moreover, this is especially the case for research of human interaction in the classroom setting whereby the positivistic researcher will face a mammoth challenge (Cohen et al., 2011). Positivist research as scientific research is objective and value free and may be contrasted with interpretivism in terms of focussing on meaning and perspectivity (Henderson, 2011).

However, positivism has been rejected for use in research because it does not consider the subjective states of people. Moreover, this philosophy sees that people's behaviour as passive and as controlled by the environment and therefore, a major criticism of positivism is that it dehumanises people by looking at them objectively. This created a need for a more subjective approach in scientific enquiry (Dash, 2005). In this study positivism was rejected because it did not consider the subjective states of individuals, and was therefore deemed to be objective.

### **3.2.2 Anti-Positivism**

Anti-positivism says that a phenomenon is experienced and interpreted by an individual according to their own ideology and in this regard social reality is seen and interpreted according to individual ideological positions: meaning knowledge is personally experienced rather than acquired (Dash, 2005). Moreover, in anti-positivism the experienced phenomenon is considered to be complex and can only be verified when all dimensions of the phenomena are explored (Dash, 2005).

Anti-positivists criticise positivism and say that science is objective where they prefer the subjectivity in research (Wicks and Freeman, 1998).

In this study, the phenomenon i.e. teaching children art, is experienced by teachers who interpret the phenomenon. It is reasonable to expect that teachers hold certain values and beliefs about themselves. By adopting an anti-positivist approach, we can look at the phenomenon in more detail from the view of the teacher who is experiencing the phenomenon of teaching children. This should reveal aspects of the phenomenon that are relevant to them as teachers, which are also relevant to the aim of the study which is to find out how they engage with children in the classroom which are potential influences.

Therefore, it was vital to include in the interviews and questionnaire qualitative questions designed to elicit qualitative data about the experience of working with children and children involved in art. The questionnaire also included quantitative data, which was designed to elicit quantitative related to demographics and practical methods. The questionnaire also included questions on a Likert scale, these are a quantitative way of capturing qualitative objective opinions, the reason for this is so that these opinions can be statistically analysed.

### **3.3 The Methodological Approach**

There are three schools of thought associated with anti-positivism: ethnomethodology, symbolic interactionism and phenomenology. These will now be addressed individually in relation to their relevance and applicability to achieve the aims and objectives of the study. Based on this analysis there will be an explanation of the reasons for their rejection or adoption.

#### **3.3.1 Ethnomethodology**

Ethnomethodologists are interested in the norms and behaviours that people use to order their world. Ethnomethodologists are primarily concerned with the interpretation that is used to make sense of their social setting (Dash, 2005). This approach provides an interpretive and descriptive analysis of the denotative and connotative meanings that help form the practices in our everyday lives (Uzzell and Barnett, 2006). Ethnography is often used to study different or exotic cultures and an important aspect of ethnography is to understand the culturally specific behaviour and attitudes that make people feel they are members of a particular group (Uzzell and Barnett, 2006).

Where ethnography may be relevant to this study is that it seeks to study human behaviour and understand the phenomenological viewpoint i.e. the world view of those being studied. Moreover, ethnography seeks to understand how people behave in their real-world setting without being influenced by the researcher, and finally, ethnography is interested in the context or environmental factors of an experience (Uzzell and Barnett, 2006).

However, the reason that this approach to research is not considered appropriate for this study is because the approach is primarily directed at understanding cultural phenomena and how people make meaning of their world and the researcher has to immerse themselves into the natural setting of a group in order to describe the lifestyle and culture of people (McNeill and Chapman, 2005).

#### **3.3.2 Symbolic Interactionism**

Symbolic interactionism places an emphasis on the fact that people interpret and define other peoples' actions rather than simply reacting to such actions (Dash, 2005). Symbolic interactionism views people as actors in the world who have to change their behaviour according to the behaviour of other actors, and that we are only able to adjust to the actions of others because we are able to interpret such actions. Thus, interactionism is concerned with humans rather than society (McClelland, 2000).

Another important aspect of symbolic interactionism is that it is not bound by the stable norms of society because it focuses on the more continuously changing and readjusting social processes. In other words, socialisation creates stability in societies and for interactionism the interaction between people “creates temporary, socially constructed relations which remain in constant flux, despite relative stability in the basic framework governing those relations” (McClelland, 2000 p.1).

Although the approach seeks to understand how people interpret and understand others, which may be an appropriate approach if we were considering how the children interacted with teachers, this approach is not appropriate for understanding the experience of the phenomenon of teachers involved in teaching art to children. It must be emphasised that the aim of questioning the teachers about their experience of teaching is to find out how and to what extent they are involved with and influence the children and how they feel their involvement is necessary and how it influences the children. The questioning is not primarily concerned with the specific interactions and interpretations between teachers and pupil and therefore, a symbolic interactionism approach was rejected.

### **3.3.3 Phenomenology**

The phenomenology school of thought believes that individual behaviour is influenced by the experience from an interaction with the phenomena. This was achieved by gaining an understanding of the meaning of human experiences, and looking at emotions in different situations such as within marriage, in work relationships and with regards to the child/ teacher relationship. Edmund Husserl is considered the founder of phenomenology, however, there are criticisms of Husserlian phenomenology. One criticism is that Husserl opposes consciousness and the world (Belousov, 2016). Husserl was objective in that he tried to understand the essence of a phenomenon and tried to apply a “one truth” which is rejected by postmodernists who say that truth is constructed by individuals and is always changing” (Dowling and Cooney, 2012). Heidegger, a student of Husserl, said that describing the experience was not enough, he wanted to see the greater meaning of being, to uncover hidden meaning and to move from description to interpretation (Dowling and Cooney, 2012).

## **3.4 Adopted Methodology: Phenomenology**

Crane 2004 (cited in Dowling and Cooney, 2012 p.24) provides a quotation from Heidegger which justifies Heidegger’s interpretative phenomenology adoption in this study: “We do not experience mere sensations abstracted from the real objects of the world: rather our experiences are of everyday objects in all their richness and complexity”. It is the intention of this study to understand the art teacher’s experience of

conducting art classes and their involvement with children. It is the revealed factors of these experiences that are investigated as potential influences that are taking place.

Heidegger was a student of Husserl, who criticised, modified and further developed Husserl's approach. He stated that people were hermeneutic (interpretive) and were able to find meaning in their lives (Wojnar and Swanson 2007, Dowling and Cooney, 2012). Moreover, the interpretation and meanings which they made about situations were based on their own background.

The main differences between Husserl's and Heidegger's phenomenology was that Husserl's could be considered as being too descriptive and only regarded the context associated with 'peripheral significance'; whilst Heidegger's approach could be observed as being interpretive and regarded the context as of central importance (Wojnar and Swanson 2007).

It is the aim of interpretive phenomenology, to understand, describe and interpret people's experiences (Tuohy et al., 2013) and it is based on the idea that a person is situated in the world. This approach is put forward by Dasein, who said that 'being human is... a situated activity, a situation in which things are encountered and managed' (Reed and Ground, 1997 cited in Tuohy et al., 2013 p18).

It is very important when using an interpretive phenomenological approach to the research to acknowledge the position of the researcher: this is because this type of phenomenology is interpretive and therefore, will be interpreted by the researcher who will have a pre-understanding of the phenomena under investigation. Tuohy et al. (2013) say that there is fore-structure, meaning that researcher has prior awareness or a pre-understanding before interpretation takes place, based on their prior experiences. In the present study the researcher is an art teacher from the Mecca region Saudi Arabia who has prior experience teaching children and young people, and therefore, has preconceived ideas and pre-awareness about the phenomena under study, i.e. teachers conducting art classes.

The researcher decided to use Heidegger's approach to phenomenology because the context has been considered to be very important. People are interpretive and this is how they find meaning. Therefore, how teachers interpret their own situation whilst conducting art classes is something that the present study is interested in.

In summary, an interpretive phenomenological approach was adopted for this study, specifically in relation to the teacher's experiences in engaging children in art activities.

### **3.5 Ethical considerations**

Because children were involved in the study, it was imperative that there had been proper informed consent from parents for the participation of their children in the research, which includes the experiment. Freeman and Mathison (2009) say that it is important to have someone on the inside of institutions to help in the process of recruiting children for the research. The researcher established a relationship with a person who would act as a liaison between the researcher, the schools, the parents and children and the education authorities. This person is a senior employee of the Ministry of Education and is the manager for all of art departments for all schools in the Mecca region.

This person will help to ensure that the parents and children are fully aware of the intentions of the study and will also help to recruit the children from the schools and will assist in the informed consent process.

In reference to the teachers, it was very important to protect their anonymity in all three of the primary research methods, namely; questionnaire, interviews and observation. The reason for this was that teacher may not have wanted to be identified for their comments which may have been perceived as being negative towards their own schools, and could have placed their employment at risk. Teachers were assured in the respective participant information sheets that their anonymity will be protected and confirmed they were aware of this through the consent forms (See Appendix)

During the ethical application process, all parties were given information about the study and why they were required, as well as how their data would be used and stored. The ethical approval procedures at De Montfort University were followed.

## 3.6 Methods

### 3.6.1 Introduction

The research included a number of primary and secondary research methods in order to achieve the aims. The secondary research method that was adopted included a review of the literature. The primary research methods included questionnaires, interviews, observation, document analysis of curriculum documents, experimentation and evaluation of creativity using CPSS. The researcher employed the Statistical Package for Social Sciences (SPSS).

The research methodology involves the collection of quantitative data from the questionnaires and qualitative data from the questionnaires, interviews and observation. Therefore, the study adopts a mixed methods approach. It has been argued that mixed methods research is a research paradigm in addition to quantitative research and qualitative research (Johnson et al. 2007).

Mixed methods are used by researchers in the behavioural and social or social sciences because they believe that both quantitative and qualitative data are useful for addressing research questions (Johnson et al. 2007). This is illustrated in Figure 3-1 whereby questionnaire, interview, observation and document analysis (curriculum) are shown to provide a more rounded understanding of the teaching approach and class structure.

*Figure 3-1 Venn Methods*





In addition to the secondary research of the review of the literature, this study has employed primary research methods, which are now addressed. These include questionnaires with teachers; interviews with teachers, observation of classroom teaching and analysis of the curriculum, all of these methods are employed prior to the development of the experimentation as they reveal the various factors that are required for the design and development of the experiment.

In addition to these methods was the experiment itself which was used to investigate the effect of teacher involvement variables on creativity in children. The experiment will involve the children drawing with the inclusion and exclusion of the identified variables to investigate the impact that they have on the creativity of children engaged in art, described in Chapter 4.

Upon completion of the experiment the art that are produced by children need to be assessed for their level of creativity. This evaluation of creativity was conducted for all of the drawings that were produced in the variable and control experiments. Through comparison of creativity between the art produced in the different experiments it is possible to verify if certain experimental variables have an impact on creativity, more specifically, for example, if the inclusion of engagement impacts negatively or positively creativity. For this the assessment tool Creative Product Semantic Scale (CPSS) was employed, described in Chapter 5.

In order to conduct the data analysis, the researcher employed the Statistical Package for Social Sciences (SPSS). The researcher also employed appropriate statistical techniques to analyse the collected data, which included Factor Analysis, Kaiser-Meyer-Olkin (KMO) and Bartlett's Test, Correlation Matrix, Variance Explained, Component Matrix and analysis of Fractional Factorial Design. Moreover, Cronbach's Alpha coefficient was used to test the reliability, described in Chapter 7.

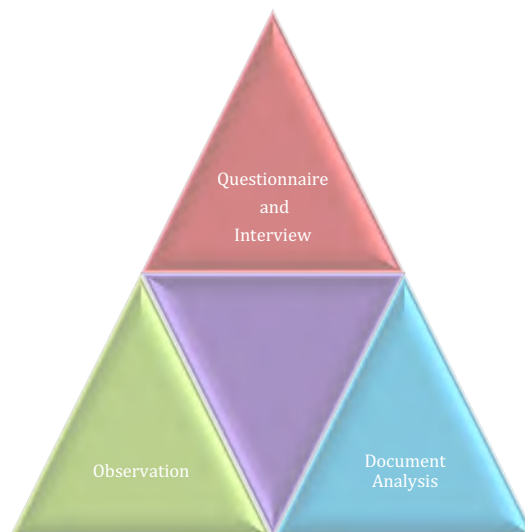
This chapter presents the methods employed, including their justification, development and how they are used.

### **3.6.1.1 Reliability and Validity**

Considering reliability and validity in this study, it is important for the researcher to consider these issues when they are developing the methodology and analysing the data. The results should be generalisable to the real world beyond the experiment, this would require internal validity where ideas about the independent variables and their effect on the dependent variables are supported by the study, and the external validity is the extent to which the findings can be generalised (Walliman, 2011, Cohen et al., 2011). According to Zhang and Wildemuth (2009), the quality of the research conducted in the positivist paradigm is assessed through reliability, validity and objectivity. However, this study is interpretive in the sense that the researcher

will interpret the results and therefore, it is different from the positivist tradition in terms of its inference processes, assumptions and research intentions, which means that the reliability and validity of the results cannot be judged using conventional criteria. In response to this Lincoln and Guba (1985) proposed four criteria that could be used to evaluate interpretive research: these were credibility and transferability. Here four research methods are used together to ensure we achieve valid result for the study figure 3-2. Triangulation will be conducted, whereby the results related to the ways that teachers are involved with children in the classroom are check for validity and reliability, this will be achieved through inputting the data into SPSS to check validity and reliability of the statistics using Cronbach’s Alpha. Patton (1999) says that triangulation is a way of checking the consistency of findings that have been derived through different research methods, in the case of the present study questionnaires, interviews and observation.

*Figure 3-2 Triangulation Methods*



### **3.6.1.2 Credibility**

Credibility refers to how credible or adequate the representation of the social world that is under investigation is. There are a number of ways of achieving this, recommended by Lincoln and Guba (1985). A method of ensuring the validity employed in this study is to check with the respondents themselves: Groenwald (2004) recommends giving the participants of the study a copy of the text for validation purposes to see if it reflects what they said: in this study this was achieved through conducting pilot studies for the questionnaire, interviews and experiment observation. A further method of checking credibility, which is suitable for this study, includes checking interpretations against raw data (Lincoln and Guba, 1985): in this study the raw data will be the drawings that are produced by the children in the control group of the experiment. Moreover,

the teacher will be briefed to ensure they know how to conduct their role during the experiments and the teacher will also participate in briefing before in the experiments to ensure that conduct the class according to the requirements of the experiment. Importantly, to ensure credibility of the research, the researcher has to ensure the credibility of the methodology, the data collection method and interpretation of the results (Lincoln and Guba, 1985). To further improve the credibility the researcher conducted observation in two instances, firstly, as a primary research method, in addition to the interviews and questionnaires, to determine the variables to be tested in the experiments, and secondly, as part of the pilot experiments in order to ensure that the experiment variables were being tested according to the experiment design.

### **3.6.1.3 Transferability**

According to Lincoln and Guba (1985), transferability is about how the researcher's working hypothesis can be used in other contexts. The researcher is responsible for providing data and description of the data that is rich enough so that other researchers are able to determine whether or not the findings can be transferred to other contexts.

### **3.6.2 Literature Review (secondary research)**

The review of the literature contributed towards the understanding of the factors that are relevant to the involvement of adults with children when engaged in art and the effect that the involvement will have on creativity. More specifically, the literature reveals the different pedagogical approaches that teachers use in art classes and importantly, that these approaches by teachers have an effect on creativity in children. These pedagogical approaches inform the design of the experiment.

A review of approaches to participatory design in the literature revealed that allowing freedom and spontaneity was identified as a positive factor; however, in participatory design there was significant involvement which was considered a negative factor. The review of the literature also revealed the different types of involvement and potential influences where children are engaged in creative activity with adults in various roles. These are essential factors relating to influence and understanding conditions which are conducive to fostering or stimulating the uninterrupted imagination of a child.

Evidence of the types of involvement as potential influence to be considered in this study included Burkitt et al. (2010 p.263) who said that children get verbal suggestions in the form of advice, Roth (1996) who said teachers can influence children by making suggestions about forms and shapes and hints about improving designs, Einarsdottir et al. (2009) that provisions, interactions and support from adults influence children's drawings and Rose et al. (2006) who claimed that because teachers tend to value realistic drawings they often

encourage children to do this. Moreover, Burnett and Mandel (2010) say that some pupils find public praise uncomfortable and that they may determine their own ability based on this feedback and Cassou (2004) says that there should be no criticisms of the work because it is damaging to the child and children should be under no pressure to perform. McArdle (2001) suggests that children should be allowed to work independently without any interference.

In reference to the ideas that engagement can have positive effects on creativity in children, Pavlou (2006) says that adult involvement is important for artistic development and confidence in artistic ability, and Garaigordobil (2006) says that graphic-figural creativity was enhanced by cooperative-creative play. However, even Garaigordobil (2006) says that the characteristics of the children who observe and supervise the children may have an effect on children and that creative activity should be natural.

### **3.6.3 Questionnaires with Teachers**

The main purpose of the questionnaire is to find out current pedagogical approaches by teachers when engaged with children in the classroom and also to understand the role of the curriculum in their approach. The questionnaire serves to show how teachers are involved with children which informs the justification and discussion of the study and also serves to reveal factors in relation to teacher involvement being investigated for its effects on creativity.

Although the questionnaires for art teachers does contain closed questions which will be used for quantitative analysis, the questionnaire also contains open questions for which the responses will be analysed qualitatively. The idea of using open-ended questions in questionnaires is to reflect the opinions of the respondents Hancock et al. (2009).

#### **3.6.3.1 Development of the Questionnaire**

It should be understood that designing questionnaires is not always an easy task because they require careful selection and writing of any associated questions, an emphasis on their design, and attention being paid to their distribution and piloting (Bell, 2010). When developing the questionnaire, it is important that the questions are aimed at the purpose, so the questions have to be focused on teaching art. Because the questionnaire was self-administered, this had to be considered when designing the questions because this mode of administration would have had an impact on how the questions were asked and answered (Peterson, 2000).

Both open and closed questions are used in the questionnaire. The reason for this was that the researcher wished to gain demographic information about the teachers, quantitative information about the classroom arrangements and qualitative information that revealed feelings, attitudes and experiences of participatory design with children in line with the phenomenological aspect of the methodology. In support of this approach, McBurney and White (2007) stated that in a single study, both open and closed questions were often used together, which enabled respondents to expand on a response they gave to a closed question by answering an open question. An example of this that was provided in the questionnaire is represented below:

**1. Your involvement is necessary in the following parts of the design process**

☐ Instructing   ☐ Encouraging   ☐ Providing feedback   ☐ Discussion   ☐ Monitoring

**2. At which stage of the design process are you more involved with the children and why?**

With this approach it could be determined which part of the artistic process teachers were more involved in and could quantify this data as well as highlighting any other implications which had arisen.

With closed questions, the responses are pre-specified by the researcher. This means that in order to provide meaningful answer alternatives, the researcher is required to have prior knowledge about the research subject and the participants and how the answers will be used (Peterson, 2000). The researcher in the present study had extensive experience with art and creativity with children. According to Peterson (2000), one source of closed questions was the researcher's prior experience - and by pre-specifying the answers, the research could emphasise answers which would provide relevant information (Peterson, 2000).

There are different types of closed questions which are used in questionnaires. Firstly, there are dichotomous questions which only have two possible responses and are used for factual characteristics (Peterson, 2000) such as 'Are you male or female?'. Some questions are multi-categorical but are actually a series of dichotomous questions because there is an implied yes or no answer, for example:

**Which parts of the design process is your involvement necessary?**

☐ Instructing   ☐ Encouraging   ☐ Providing feedback   ☐ Discussion   ☐ Monitoring

Questionnaires can also use another type of closed question which are either monadic scale or rating scale questions, which have graduated responses suitable for eliciting information about attitudes, opinions and preferences (Peterson, 2000). An example of this type of question which was used in this questionnaire is represented below:

**The restriction of materials to be used is specified in the curriculum. This will negatively affect the children's ability to produce designs**

☐ Strongly agree   ☐ Agree   ☐ Neither agree or disagree   ☐ Disagree   ☐ Strongly disagree

Open questions are different to closed questions because the respondents can word their own answers and say what they feel (McNeill and Chapman, 2005). Moreover, open questions may enable respondents to reveal the reason behind their answers and also to reveal information not anticipated by the researcher (Burney and White, 2007).

The open questions were used to gain insight into the current practical methods e.g. model making and printing; how children were influenced by materials; the varying abilities of children and how this affected their work; the varying abilities over age groups; the extent of involvement of the teachers and the ways that work was assessed. Some questions needed to be framed in a way that would avoid bias from teachers. For example, the author wanted to determine how children were influenced by their teacher, but was unable to ask this question directly because for the teacher there would be a negative connotation about their influence. Therefore, the questions needed to be framed in such a way that it would elicit this required information and would avoid possible bias in the answer.

Overall, it was the intention of the questionnaire to identify current influences and current activities and skills in order to help design the approach and to further justify the contribution of the approach.

It was deemed important that the questionnaire contributed towards achieving the aims and objectives of the research. Therefore, the questions were divided into areas with each area providing required information related to children's activities and the teachers' involvement. Thus, the questionnaire was structured according to methods employed in the classroom, materials, teacher involvement, dependency of children on teachers, creativity, class structure, curriculum and the environment.

The main objective of both the closed and open questions was to reveal information that would contribute towards understanding factors of involvement and potential influence, which will be investigated during the experimentation.

### **3.6.3.2 Sampling and Distribution of the Teacher Questionnaire**

For the teacher questionnaire, there were a total of forty respondents, excluding the piloting sample, from various primary schools in the Mecca region. Often, the minimum sample size that is required for quantitative statistical analysis is 30, and the sample size is often determined by the nature of the population under

scrutiny (Cohen et al., 2013). The criteria for their inclusion in the research was that they had to be involved in the teaching of art to children in the Mecca region, in the same age group as those who would be participating in the research.

In order to access the teachers the researcher visited the schools and approached the head of each school who handed the questionnaires to the teachers. The teachers were not required to input any identifiable information. The teachers completed the questionnaire and returned them to the contact in the school, they were then collected by the researcher.

### **3.6.3.3 Piloting of the Teacher Questionnaire**

It was important to pilot the questionnaire for two main reasons. Firstly, to see how long it would take to complete the questionnaire; and secondly, to check for question clarity to determine whether respondents had understood the instructions and the questions and would be able to provide usable data (Bell, 2010).

The questionnaire was piloted with a group of six teachers who worked in the same setting as the study area, i.e. primary schools in the Mecca region. The main issues that the researcher looked for besides the completion time and clarity of the instructions, was ambiguity and objections to answering the questions (Bell, 2010).

Importantly, the researcher also determined whether the questions actually revealed the data which was required for the research. During this stage, the researcher removed any negative aspects from the questionnaire so that the process for completing the questionnaire would be easy for participants.

### **3.6.3.4 Results and Discussion of Questionnaire**

With regards to the current art activities, it was found that there were a wide variety of activities taking place; this included woodwork and modelling, as these were the most popular methods used in the classroom. The least popular, with very little or no experience were silk screen printing and 3D modelling.

The structure of the classes was generally well defined, with sufficient time given to presenting the ideas or background to the subject and giving instructions. In relation to the latter, the teachers acknowledged that if they spent too much time on background detail and giving instructions, pupils' concentration tended to wane. The remainder of the time was allocated to artistic creativity and then to evaluation and feedback.

It was clear from the findings that the teachers felt that their role was very important and their involvement was essential to facilitate children to be creative (Table 3-1).

Table 3-1 Necessity of involvement in design process activities

**Statement: Your involvement is necessary in the following parts of the design process**

	Frequency	Percent	Cumulative Percent
Instructing	6	15.0	15.0
Encouraging	8	20.0	35.0
Providing Feedback	7	17.5	52.5
Valid Discussion	8	20.0	72.5
Monitoring	4	10.0	82.5
All	7	17.5	100.0
Total	40	100.0	

The teachers were confident in their role and the vast majority felt that they were the best judges of creativity and were also confident that the standards of the curriculum were suitable for judging creativity (Table 3-2).

Table 3-2 Curriculum requirements and standards can best assess creativity

**Statement: The standards and outcomes set out in the curriculum can best assess the child's creative ability.**

	Frequency	Percent	Cumulative Percent
Strongly Disagree	3	7.5	7.5
Disagree	4	10.0	17.5
Valid Neither	8	20.0	37.5
Agree	16	40.0	77.5
Strongly Agree	9	22.5	100.0
Total	40	100.0	

In reference to pupils depending on the teachers by asking questions and not relying on their own initiative, teachers were divided over this issue. However, there was stronger agreement regarding children being more dependent (Table 3-3), a further indication of the importance that teachers assigned to their role.

Table 3-3 Dependency of children

**Statement: Children often ask questions; they are dependent on you because they do not want to use their own initiatives and work independently**

	Frequency	Percent	Cumulative Percent
Strongly Disagree	1	2.5	2.5
Disagree	7	17.5	20.0
Valid Neither	9	22.5	42.5
Agree	15	37.5	80.0
Strongly Agree	8	20.0	100.0
Total	40	100.0	



This idea is further supported by the fact that teachers felt very strongly that pupils would not be more creative if they were left alone to work more independently (Table 3- 4). This reinforces the idea that teachers felt that they had a role in children’s creative processes.

*Table 3-4 Agreement with independent working leads to more creative designs*

**Statement: If you leave the children alone and allow them to work more independently it is better, meaning that they produce more creative designs**

	Frequency	Percent	Cumulative Percent
Strongly Disagree	13	32.5	32.5
Disagree	13	32.5	65.0
Neither	7	17.5	82.5
Agree	5	12.5	95.0
Strongly Agree	2	5.0	100.0
Total	40	100.0	

Looking more closely at the specific activities that teachers engaged in with the children, it is also clear that teachers felt their involvement was necessary in all aspects, particularly in areas such as providing feedback, monitoring and discussion (Table 3-5).

All of these areas have already been shown to be major influences on children during the creative process. Moreover, the majority of the teachers were in agreement that their involvement in the various aspects of the participatory process, such as instruction, discipline, encouraging and monitoring, had a strong positive effect on their pupils’ creativity.

*Table 3-5 Opinion of positive or negative influence of aspects of involvement*

Types of involvement	Strongly positive	Positive	Neutral	negative	Strongly negative
<b>Instruction</b>	11(28%)	10 (25%)	13 (33%)	4 (10%)	2 (5%)
<b>Encouraging</b>	28 (70%)	3 (8%)	8 (20%)	0 (0%)	1 (3%)
<b>Providing feedback</b>	13 (33%)	14 (35%)	10 (25%)	2 (5%)	1 (3%)
<b>Discussion</b>	19 (48%)	13 (33%)	6 (15%)	1 (3%)	1 (3%)
<b>Monitoring</b>	15 (38%)	12 (30%)	11 (28%)	1 (3%)	1 (3%)

Finally, the teachers were also strongly of the opinion that their involvement was not a barrier to their pupils’ creativity (Table 3-6), however, they did acknowledge the fact that this was only the case when they were merely supervising their pupils and not imposing their ideas. Moreover, the teachers stated that their

involvement was necessary in order for their pupils to concentrate, and that their involvement in the form of feedback, encouragement, reward and participation all contributed to pupils' concentration. Although the teachers did suggest that there had to be a balance, and too much instruction or direct involvement in the pupils' work could negatively affect their concentration.

*Table 3-6 Teachers' personal opinion indicator of creativity*

**Statement: Your personal opinion is a good indicator of the quality and creativity of the child's designs.**

	Frequency	Percent	Valid Percent	Cumulative Percent
Strongly Disagree	0	0	0	0.0
Disagree	2	5.0	5.0	5.0
Neither	9	22.5	22.5	27.5
Agree	23	57.5	57.5	85.0
Strongly Agree	6	15.0	15.0	100.0
Total	40	100.0	100.0	

A further indication of teachers' involvement and how it could affect children's ability to be creative was that the teachers' controlled the choice of materials that were used. However, it should be acknowledged that they did know that a restriction of materials would have a negative impact on their pupils' creative ability. It should be noted that the teachers were bound by the curriculum in their choice of materials and therefore, it was not necessarily they who were imposing the restrictions.

The primary research also revealed how the curriculum has an effect on how the teacher approaches teaching in the art class. More specifically, the pedagogical approach is largely determined by the curriculum upon which briefs, expectations and evaluations are based. The effect of the curriculum was also found in the materials that were used for art activities whereby teachers acknowledged that the choice of materials was limited by the curriculum. Moreover, the teachers clearly showed that the curriculum also has an effect on the structure of the class as well.

The study is concerned with the influences that the teacher has on the children in a classroom setting. In the above the different forms of involvement have been established which include instruction, encouragement, suggestion, feedback, discussion and judgement.

The curriculum has an impact not only on pedagogical approach to helping pupils achieve requirements of art briefs but also on the judgement of the child's work. The measure of whether the work produced by children is successful is based on the requirements of the curriculum. The curriculum identifies certain

attributes in the work which reflect certain artistic abilities that are required from the children. In the primary research with the teachers in this study it was revealed that the majority of the teachers agreed with the fact that the curriculum was appropriate for judging creativity. Another finding was that there was similarity between the children's work due to the constraints of the curriculum. This idea goes against the idea of creativity which is seen as producing something that is considered new, unusual and innovative.

Therefore, it is clear that the curriculum has an effect on pedagogical approach and evaluation of the work, both of which are inextricably linked. The evidence for this is that the skills that teachers wish children to learn and seen demonstrated in their work are informed by the curriculum, this has an effect on how they deal with the children and evaluate their work.

The main problem with this situation whereby art briefs, engagement during creative activity and the evaluation of whether the work is considered successful, all disregard the ideas that have been put forward by DuBuffet and Cizek that whatever children produce is considered to be creative and is valued. Therefore, it can be considered, as the literature has shown, that curriculum and current pedagogical approaches can be influencing factors for creativity.

Therefore, this study found potential effects on creativity of the involvement of adults within the instruction, engagement and evaluation components of the art class.

Overall, it is evident that the teachers are very much involved in the creative process and believe that their role is essential. Ultimately, their role is to develop their pupils' creative ability and this was supported by the fact that over 90 percent agreed with the idea that some children had natural creative ability; whilst for others this had to be taught. There was an acknowledgement that perhaps the children's art was similar to each other because the activity was predetermined, however, this was contradicted by the fact that teachers said that there was individuality in the children's art. Perhaps the teachers were referring to the fact that predetermined activities would have a high level of influence on outcomes.

In conclusion, the findings show that there is a high level of teacher involvement when pupils are engaged in the creativity process in school. Moreover, there has been some indication that this has an impact on drawing outcomes. However, there has been some acknowledgement of the fact that too much involvement may have a negative impact on creativity. Moreover, the influence over the children does not only come in the form of teacher involvement but also in the form of the restriction of materials.

### **3.6.4 Interviews with Teachers**

As part of the phenomenological aspect of the overall methodology a semi-structured interview is considered and justified here. Phenomenology aims to gain the experiences of a particular group of people of a particular phenomenon, in the case of this study the experiences of primary school art teachers teaching children in art classes.

The experiments of this study were designed to reflect a classroom situation in terms of the pedagogical approach by teachers with children engaged in art. Towards revealing these factors, it was important to interview teachers themselves to reveal how they engage children in the classroom. These interviews offered insight into teacher involvement in addition to that revealed by the review of the literature and the questionnaires. Interviews allowed the researcher to understand the different aspects of the teacher's involvement which were necessary to be included in the experiment.

From the interviews with teachers a number of involvement and influence factors were identified. These factors were suggested by the teachers to be negative or positive, and included for example offering suggestions, giving instructions and briefings, encouraging children and evaluating work.

#### **3.6.4.1 Interviews**

There are three main types of interview which include unstructured, structured and semi-structured interviews. These types of interview are considered for the phenomenological approach of the study. Structured interviews are characterised by a set of fixed questions for each interview where the participants are given a set of answers to choose from, effectively a questionnaire in an interview format (Matthews and Ross, 2010). Therefore, a structured interview was considered not to be suitable for allowing participants to reveal their experiences of a phenomenon because they would not be allowed to speak freely about their experience, and there would be no opportunity for the researcher to probe further into ideas as they arise. Another type of interview where the participant would be able to talk in length about their experience is the unstructured interview because it focusses on a broad area of discussion and allows the participant to talk about the topic in their own way (Matthews and Ross, 2010). However, this type of interview requires the researcher to have a high level of skill to ensure that the conversation does not go off topic, moreover, these interviews generate an enormous amount of data to be analysed.

### **3.6.4.2 Semi-structured Interviews**

The semi-structured interview offers a solution to the disadvantages of structured and unstructured interviews, on the one hand they are flexible enough to allow the participant to speak freely about experiences and allow the researcher to probe further into ideas as they arise, and on the other hand it gives the researcher a level of control over the direction and topic of the interview.

Within the phenomenological approach, which is concerned with eliciting experiences, semi-structured interviews are the most commonly used method. They are mostly associated with collecting qualitative social data where the interest is people's experiences and why they experience and understand the world in a certain way (Matthews and Ross, 2010) which is the same intention of phenomenology. Semi-structured interviews offer sufficient flexibility that allows the researcher to probe further into experiences and also allows the participant to further elaborate on those experiences.

### **3.6.4.3 Development of Interview**

It is critical in the development of a research interview that the development and selection of questions consider the broader research questions and aims of the study (Gillham, 2007). One method of developing and organisation questions is to write down as many questions as possible and then seeing which questions are essentially the same and removing them, organising them into topics and then organising the narrative sequence so that one question leads to another (Gillham, 2007).

According to the objectives of the study it is necessary to understand the experience of the phenomenon of teaching art to children, therefore, the questions have to be relevant to that experience and those aims and be designed to reveal the experiences that can be later used to inform the development of the experimentation. According to the objectives the interview questions should be designed to achieve the following:

- To understand the ways that children participate in art with adults.
- To assess the role of the teacher, their influence and involvement in the artistic process.

In the development of the interview it is important to consider how wide the topics will be in order to make sure that the questions are distinct from each other (Gillham, 2007).

It was necessary to develop an interview guide which is used to assist the researcher to conduct a semi-structured interview (Matthews and Ross, 2010). The interview guide is not a set of questions but instead is an agenda for the interview which helps the researcher to remember the points they need to cover, includes

how they can begin and end the interview, an order of topics and allows the researcher to talk in their own way (Matthews and Ross, 2010).

#### **3.6.4.4 Procedures**

One art teacher each from 10 different primary schools in the Mecca region, Saudi Arabia, was interviewed. The interview lasted for approximately 45 minutes to one hour, it was important to have enough time to allow the participants to talk about their experiences.

Permission was sought from the head teacher of each school to interview the art teachers.

The interviews took place in a quiet room on the school premises where the researcher was assured they would not be disturbed.

The interviews were audio recorded in the Arabic language, then transcribed and then translated into English. The researcher was aware of potential bias during the translation into English.

#### **3.6.4.5 Analysis of Interview**

The researcher used audio recording and transcribed the interviews for transcript analysis. For this analysis, coding of the textual data will be used. Although the data in transcripts may be interesting to read, it does not allow the reader to understand the social world that is being investigated (Basit, 2003). Therefore, the textual data has to be coded or categorised by allocating meaning to the descriptive information, and it is important to remember that coding and analysis are not the same thing: however, coding is an important part of analysis (Basit, 2003).

There are two main options available for coding, namely: manual coding or electronic coding. According to Webb (1999), in a study that analyses the different approaches to coding qualitative data for PhD students, although electronic coding offers advantages for studies with large amounts of qualitative data in terms of saving time, for most PhD studies the amount of data is not large enough to justify the additional data management.

Additionally, this study aims to understand the children's experiences of drawing using the approach of this study. In light of this, Webb (1999) says that the intellectual work of conceptualising the data can only be done with the human brain. Furthermore, Basit (2003) says that social phenomena cannot be explained numerically because it is not the intention to know how many people feel, for example, positive about an

experience, but to understand what people feel and why, which cannot be achieved through percentages and statistics.

In consideration of the above arguments, it was decided to adopt manual coding. In manual coding we assign codes to the units of data and it is important that we establish what those units of data are. This study will code for themes in the data which may be found in individual words, phrases or sentences (Zhang and Wildemuth, 2009). To look for themes in the data means that we are looking for expressions of particular ideas and therefore, a code may be assigned to a section of text of any size providing the section of the transcript represents the theme we are looking at (Zhang and Wildemuth, 2009). Moreover, it is possible to assign multiple codes to one piece of text if multiple meanings are found.

The next step in the coding was to develop the categories and the coding scheme. These are derived from the data, previous ideas from other studies and relevant theories (Zhang and Wildemuth, 2009) and for this study themes are related to the issue of influence. More specifically, the researcher coded sections of the text where there were any expressions by the teachers that would reveal any issues related to their involvement with children in the classroom. As mentioned before, the data itself will be a source of the themes, in other words there may arise new ideas from the data that were not previously conceived by the researcher. In this case it is necessary to add new codes to the coding scheme (Zhang and Wildemuth, 2009).

Because this study has already established in the review of the literature that children are influenced by adults when they are engaged in art, because adults participate to differing extents, there are a number of theories and ideas about this issue. Moreover, a number of different issues arose about the children engaged in drawing in schools with adults, from the primary research with teachers. These theories, ideas and findings form part of the basis for the inquiry and were used to form the initial coding categories. Additionally, this study is trying to achieve something, namely, to show that there will be a change in the creative ability of the children when adult influence is removed: this will also help for the basis for inquiry.

The categories developed for the coding in this study came from different sources: firstly, those developed before the data collection, which are based on the literature, the research question itself, theoretical framework and preconceived ideas that the researcher wishes to address; and secondly, from ideas that arise through analysis of the data itself.

The following areas are based on the theoretical framework of the study and the research question, both of which are presented in Chapter 1, and were considered in the development of *a priori* codes. For example, the area of ‘children need my help’ is based on the evidence in the literature that if an adult is present, the child will often seek their help; the justification by teachers that their presence is required for children to be

creative; and the opposing idea that teachers' help is a strong influencing factor on the child's creativity. The related question in the interview was "Is your role important?"

From these considerations the following are some of the *a priori codes*:

Schedule, organisation, time allocation, support, instruction, feedback, judging work, improving skills, enhancing creativity, perception of role

Additional codes will be added when the data is analysed, as new ideas emerge. These could be completely new codes based on new ideas or they could be extensions of existing codes.

Once the data is coded, it is necessary to draw conclusions. This is the stage where meanings are derived from the data and this is where the researcher looked for relationships between the different categories of data. This is the process of moving from organising and coding the data to ideas and concepts which are higher level, abstract constructs, and these ideas may interrelate towards the development of ideas or even theory (Saldana, 2008). An important part of this process is to generate themes which are a result of the coding process and the subsequent analytical reflection (Saldana, 2008). It is important to note that there is a difference between a code and a theme, for example a code may be 'creativity' and a theme that may emerge from this is 'an increased sense of creativity'. Once the themes have emerged from the data, then it is possible to start eliciting ideas and concepts from the data.

#### **3.6.4.6 Sampling for Interviews**

For the teacher interviews, there were a total of 12 participants from various primary schools in the Mecca region which is enough for the sample size (Saunders et al, 2016). It was important for the purposes of reliability that the teachers in the interviews were from the Mecca region in Saudi Arabia, the same area as the participant teachers in the experiments. The criteria for their inclusion in the research was that they had to be involved in the teaching of art to children in the same age group as those who would be participating in the research. The reason for this was that it was required that the participants have the capacity to inform the research, therefore, the study adopted purposive sampling (Quinlan, 2015). In order to access the teachers the researcher visited the schools and approached the head of each school. The teachers were not required to input any identifiable information.



### **3.6.4.7 Piloting**

It was important to pilot the interviews for two main reasons. Firstly, to see how long it would take to complete the interview; and secondly, to check for question clarity to determine whether respondents had understood the instructions and the questions and would be able to provide usable data (Bell, 2010).

The piloting involved conducting three interviews with teachers who worked in the same setting as the study area, i.e. primary schools in the Mecca region. The main issues that the researcher looked for besides the completion time and clarity of the questions, was ambiguity and objections to answering the questions (Bell, 2010).

It is important to pre-empt the fact that there may be unexpected events during the interview and to make sure that the semi-structured interview as a research method is suitable for achieving its aims (Seidman, 2006).

### **3.6.4.8 Result**

The results of the interview show that the teachers felt that their role was primarily as a facilitator, and that they were there to guide the children. Where they were asked in what way do they facilitate the class some teachers said through providing materials. In response to the idea of guiding the children teachers say that they check their work and give suggestions on how their work can be better. Teachers also mentioned that their role involves ensuring that children achieve the tasks that are in the text book. All teachers agreed that their role was important, and associated this with the aforementioned ideas of facilitation and guidance.

In order to make sure that the children understood what they have to do the teachers always introduced the topic and then briefed the children about the exercise that they had to complete. Moreover, while the children were engaged in the art exercise teachers checked that the children were doing what was required of them.

In reference to preparation of the class, all of the teachers said that they use the teachers book to find out about materials and any practical aspects and how long they think they will take. Where the teachers were questioned about managing the class the main idea that arose was that they tried to make sure that children completed tasks on time.

The teachers motivated their students by encouraging them and giving them compliments. Some of the teachers said that they try not to give negative comments but instead made suggestions on they could improve their work.

In reference to the idea of a hands on or hands off approach, the general idea was that although they understood the benefits of a hands-off approach, they had to be hands - on to a certain extent in order to ensure that the children were doing what the task required.

It was clear from the responses to the question about how the curriculum guides the structure of the class that the teacher's book, which is based on the curriculum, offered a level of structure to the class, this was in terms of briefing the children, the exercise itself, and then discussion, an overview and evaluation at the end. Moreover, the teachers said that procedures of the practical exercise are included in the book.

Therefore, from the primary research with teachers the structure of the art class was revealed and it included three main stages, these were the instruction stage, the engagement stage and the evaluation stage. It is within this class structure that the various forms of teacher involvement can be found, for example, giving instructions and criteria for art is within the instruction stage, encouraging, suggesting, discussing and providing feedback are within the engagement stage, and finally, providing judgement and marking are found within evaluation stage.

### **3.6.5 Observation of Classroom Teaching**

In addition to interviewing teachers, the questionnaires, and the review of literature as part of revealing the factors of teacher engagement with children in the classroom, the researcher also attended art classes in the research area (Mecca region, Saudi Arabia) and conducted observation. In the social sciences observation can be based on participant observation (Marvasti, 2014). The researcher observed how the teacher conducted the class and how they engaged the children. Specifically, the researcher wanted to observe how the teacher structured the class explained ideas, gave instruction, encouraged children and gave them feedback as well as the methods of evaluation. This observation was informed by factors revealed in the other primary and secondary research, specifically, these include the aspects of instruction, engagement and evaluation.

Observation involves watching someone performing a task to elicit data about specific aspects of behaviour or processes (Bell and Waters, 2014). In this study the researcher is interested in the behaviour of teachers in terms of how they engage with children and the process of the art class.

Prior to the observation it was important to consider what should be observed, what the main areas of interest are, and that the observation would reveal the information that is required (Bell and Waters, 2014). In relation to this, specifically the researcher wanted to observe the different ways in which the teacher engaged with the children, the structure of the class in terms of its procedure and the engagement with children within that

structure. These aspects have already been identified in the interviews and questionnaires that took place prior to the observation and the observation serves to see these identified aspects in action to further validate the findings of the other research methods. Using observation as a form of validating other evidence has been identified by Bell and Waters (2014).

### **3.6.5.1 Procedure**

From the primary research with teachers the structure of the art class was revealed and various forms of teacher involvement were found, for example, giving instructions and providing examples of art, encouraging, suggesting, discussing and providing feedback stage, providing judgement and marking. These findings were used as a basis for the observation where these factors were checked to see if they were present in a real life classroom situation.

The researcher observed the class without making any interruptions to proceedings and recorded the observations using the form shown in Table 3-7. The research did not engage with the teacher or the children in any way. In total there were three observations at three different schools in the Mecca region, Saudi Arabia which were randomly selected but not used in the main experiments.

### **3.6.5.2 Results**

Overall the observation showed that each school was very similar in the way that classes were conducted in terms of the instruction, engagement and evaluation. For instructions in all three of the observations it was observed that the teacher introduced the idea to the children, gave instructions and provided children with examples. The same was true for the engagement aspect of the class whereby the teachers in all three of the observations were observed offering feedback, making suggestions, discussing the work and encouraging the children. Finally, the researcher wanted to observe if there was evaluation as part of the class structure, as had been suggested by the prior research. For all three observations, the different aspects of assessment and evaluation, which were deemed to be giving opinions about completed work and assessment according to the requirements of the curriculum, were observed by the researcher, specifically this included checking that the work achieved the aims of the class, and giving critical feedback during assessment.

Therefore, the findings of the prior primary and secondary research were confirmed by the findings of the observation. This validity further justified the inclusion of the identified variables in the experimentation.

### 3.6.5.3 Table 3-7 Observation Checklist of Structure of the Art Class

Table 3-7 Observation Checklist of Structure of the Art Class

Structure of the Class			Observation 1	Observation 2	Observation 3	Comments
Aspects of Teacher	1. Instructions	Introducing the idea				
		Giving instruction				
		Example				
	2. Engagement	Feedback				
		Suggestion				
		Discussion				
		Encouragement				
	3. Evaluation	Opinion / judgment				
		Assessment				
Procedure	Design techniques and materials					
	Design brief					
	Duration					

### **3.6.6 Analysis of Curriculum**

The researcher conducted analysis of the curriculum in order to see how the curriculum has an impact on how teachers engage with children in the art class. The curriculum was for the primary schools, year 6, in the Mecca region in Saudi Arabia. Analysis of the curriculum offers insight into how and why the teacher engages the children in certain ways, for example, the instruction that they give, how they advise children and way that work is evaluated is all informed by the curriculum and therefore, such analysis will shed light on teacher involvement. The curriculum has an impact not only on pedagogical approach to helping pupils achieve requirements of art briefs but also on the judgement of the child's work. The curriculum identifies certain attributes in the work which reflect certain artistic abilities that are required from the children. In the primary research with the teachers in this study it was revealed that the majority of the teachers agreed with the fact that the curriculum was appropriate for judging creativity.

#### **3.6.6.1 Documentation analysis**

Reasons for analysing curriculum documentation include understanding the curriculum in terms of how it informs classroom teaching and judgement and evaluation of children's work as well as the structure of the class. The Saudi curriculum for the subject 'Art Education' is found in three tiers of documentation which include the overall curriculum disseminated from the Ministry of Education, the teacher's guide and the children's workbooks.

The documentation that was analysed was the art curriculum for primary school year 6 for all of Saudi Arabia for 2016/17. The curriculum documents were developed to inform schools in Saudi Arabia about what is required in terms of lessons and the academic content that should be taught in the school. The curriculum is developed and issued by the Ministry of Education and distributed to the local education authorities together with the materials to support the national curriculum. Specifically, the curriculum documents contain the knowledge and skills that the children should acquire as well as the learning objectives, learning standards and assessment. The process of collecting the curriculum document involved the researcher obtaining a copy from one of the teachers involved.

The main curriculum documentation is translated as 'method of curriculum for art education in primary schools in Saudi Arabia'. This document includes a theoretical framework which includes the philosophy behind art education, the aims of art education, the required methods and styles of learning and teaching and activities and assessment. The document also includes a practical framework which addresses the aims and competence achievement for each class and overall competence achievement for the academic year for each

level. The aims specifically refer to competence achievement in individual subject areas such as symmetrical art, textiles, metal work, woodwork, printing and craftwork. The curriculum also contained provision about the duration of classes.

The following is a framework that illustrates the overall structure of contents of the teachers' guide with examples of what could be included:

**1. Providing examples of previous work**

**2. Aspects / Important knowledge for the lesson**

**2.1. Aspects of knowledge**

2.1.1. The concept of the idea

2.1.2. Artists in this area

**2.2. Aspects of Skill**

2.2.1. Practical skills for that particular subject

2.2.2. Highlight the features of materials

**2.3. Aspects of feeling / sentimental aspects**

2.3.1. The meaning of the type of art, e.g. abstract

2.3.2. To create inspiration

2.3.3. How the art is appreciated

**3. Aim of the lesson**

3.1 Definition / Concept of the artwork

3.2 Aesthetic value

3.3 Choice of form e.g. natural or unrealistic

3.4 Practical skill

**4. Procedure of the lesson**

4.1 Show examples

4.2 Discuss example

4.3 Explain concept of this type of art

4.4 Discuss feelings and opinion of this art with children

4.5 Providing feedback

4.6 Offering encouragement

4.7 Characteristics of the example

4.8 Importance of the art concept

4.9 Preparation of equipment

**5. Encouragement**

5.1 Concept of the lesson

5.2 Final product

**6. Learning tools (examples)**

**7. Requirements**

**8. Lesson preparation (materials and tools)**

**9. Assessment and evaluation (through completing assessment form)**

9.1 Checking against aims

9.2 Critical feedback

9.3 Negative and positive aspects

**10. Summarise lesson**

**11. Grading (grading form)**

The analysis of the teacher's workbook revealed certain aspects of the structure of the class where teachers interact with pupils. One aspect of the class included giving examples of the art and an introductory background to the art as well as the aim of the lesson. Another aspect included the engagement the teacher should have with pupils which includes aspects such as discussion with pupils about the art and how they feel, providing feedback and motivation through offering encouragement. Finally, a clear aspect of the lesson was assessment and evaluation, where the teacher will together with the children check the work against aims, offer critical feedback and highlight the negative and positive aspects of the work.

During the analysis of the teacher's guide it was noted that all of the units were solely concerned with the practical development of skills, there was no consideration for teaching for creativity and it is reflective of an overall curriculum that is very much practical skill and competence based for the age group of this study (year 6).

The pupil's workbook is based on the curriculum and the teachers' workbook is a support tool to ensure that the pupils are being taught according to the curriculum. It was noted that the pupil's book offered many examples for each of the classes. Evidence of the procedure of the class can be found in the form of pictorial examples and instruction. However, the pupil book was found to be limited to this, it was very visual and practical based, there was no evidence criteria and assessment. Therefore, children would have to depend on the teacher's involvement to understand the learning outcomes and assessment criteria. Such dependency was evidenced in the questionnaire with teachers where a dependency on teachers by pupils was found, especially in areas related to feedback.

### 3.6.6.2 Findings

The curriculum document analysis revealed how the curriculum informs the teacher approach to teaching in the art class. More specifically, the pedagogical approach is contained within the curriculum and the supporting teacher's guide towards achieving its overall objectives. Additionally, the curriculum largely determines the briefs, expectations and evaluations.

The curriculum document contained information about the time that should be allocated to teaching, working with pupils and discussion. The total time for each lesson was one and a half hours. The curriculum contained information about the structure of the class which should include providing existing examples of art, discussion which includes motivation and assessment of outcomes.

Moreover, the curriculum established the area that should be taught for each class, which included, for example, architecture, calligraphy, symmetrical patterns, Islamic and cultural heritage, environmental features of Saudi Arabia and creating models. The curriculum also contained the assignments that should be allocated to pupils and the materials that should be used.

The analysis of the curriculum revealed factors that concurred with the primary research with teachers. For example, the curriculum established class structure and the teachers clearly expressed in questionnaires and interviews that the curriculum has an effect on the structure of the class and the curriculum also established the skills and knowledge that children should acquire, again teachers in the primary research revealed that they wish children to learn skills and see those skills demonstrated in their work according to the curriculum.

Pedagogical approaches were clearly identified in the analysis of the curriculum and the teachers also acknowledged that the curriculum informed their pedagogical approach. This was also found to be the case for evaluation whereby the teachers said that the curriculum affected how they evaluated children's work.

The main problem of a constriction of the curriculum includes that art briefs, engagement during creative activity and the evaluation of whether the art is considered successful, all disregard ideas about creativity and the imagination, this was evidenced by the fact that the curriculum documents are very practical and skilled based offering children very fixed art activities. In this sense in terms of informing teacher approach, structure of the class, activities and expectations for outcomes, the curriculum was found to be very prescriptive and does not allow for independent creativity. This goes against ideas that have been put forward by DuBuffet and Cizek that whatever children produce is considered to be creative and is valued. Therefore, it can be considered, as the literature has shown, that curriculum and current pedagogical approaches can be



influencing factors for creativity, and it is the aim of this study to investigate if this is true, that such involvement has an effect on creativity.

### **3.7 Conclusion**

This chapter presented the consideration of the employed methodological approach. Different approaches were considered in light of the aims of the study and their need to be rejected, and there was a justification for adopting a phenomenological approach. The chosen methods, namely the experiment, interviews, questionnaires, curriculum analysis and observation were presented, specifically, this chapter provided details about their application and why they were necessary in this study. The results of the questionnaire, interviews, observation, analysis of curriculum and review of the literature were presented here and they will form the basis of the design of the experiments which is presented in the following chapter.

The chapter presented the methods that were employed in the study. Specifically, the chapter showed how certain methods were used to derive the different factors that need to be considered in the design and development of the experiment.

The employed methods revealed findings that were related to how teachers conducted art classes, how teachers engaged children, the specific types of engagement, how the curriculum had an impact on that engagement and the structure of the class, all of which were used to inform the types of involvement as potential influences on creativity to be investigated in the experiment.

**4 DESIGN OF THE EXPERIMENT AND EVALUATION**

**CHAPTER FOUR**

**CONTENTS**

4.1 INTRODUCTION.....78

4.2 EXPERIMENT METHODOLOGY .....78

4.3 EXPERIMENT DEVELOPMENT .....82

4.4 EVALUATION.....91

4.5 CONCLUSION.....105

**TABLES**

TABLE 4-1 DESIGN OF THE EXPERIMENT .....90

TABLE 4-2 CPSS INSTRUMENT .....101

**FIGURE**

FIGURE 4-1 DIMENSIONS, SUBSCALES AND ADJECTIVES OF ADAPTED CPSS.....101

## **4.1 Introduction**

This chapter presents the methodological aspects of the experiment including sampling. Moreover, the development of the experiment in terms of variables and experiment design is also presented. Finally, the chapter presents the adapted method for creativity assessment. In the previous chapter the findings of the secondary and primary research were presented. The research revealed the ways that teachers engage children in the art class and the structure of the class towards understanding the relevant factors, as potential influences, to be investigated in the experiments. Numerous types of activity by teachers were identified which included instruction, engagement and evaluation which, as sources of potential influence, will form the basis of the experiment design presented in this chapter.

It is important to establish these factors towards achieving the aims and objectives of the study. These factors will be considered as variables in the experimentation to investigate whether these factors have an effect on creativity in children. This chapter presents the design and development of the experiments based on the identified factors which will be categorised as instruction, engagement and evaluation to determine their effects on creativity in children's drawings.

The methodology involved a critical consideration of appropriate tools for the comparative evaluation of creativity of drawings produced under the various experimental variables. In this chapter, there is a critical evaluation of the potential tools and the reasons for their adoption or otherwise. Specifically, these tools included Rhodes creativity approach, TTCT (Torrance Test of Creative Thinking), CAT (Consensual Assessment Technique) and CPSS (Creative Product Semantic Scale). After this critical evaluation and careful consideration of the aims of the study it was decided to adopt CPSS by Besemer and O'Quin and their application in the study is explained. The chapter includes the adaptation of CPSS and how it will be applied for a comparative evaluation of creativity.

## **4.2 Experiment Methodology**

This experiment methodology will show the sampling for the experiments, which includes consideration of sample size, age and ethnic background. The methodology also presents the experiment factors, which include brief, techniques, location, duration and physical layout of the classroom.

### **4.2.1 Sampling of the Children of the Experiments**

For the sampling of the experiments a number of issues had to be considered which included the sample size, age, gender and ethnic background. An explanation of the choices is presented for each issue. The type of

sampling that is employed for this study is judgment sampling or purposeful sampling. Judgment sampling means to choose the sample in order to answer the research question (Marshall, 1996). Coyne (1997) says that purposeful research is about selecting participants according to the aims of the research, but also depends on the time that is available to the researcher and other practical implications such as the place and the availability of the participants.

#### **4.2.1.1 Sample size**

The children were selected from a primary school from the Mecca region in Saudi Arabia. It was important that the school was an average school in terms of artistic achievement and not known as a specialist school in any way: this was because it was important to avoid sampling pupils who may have advanced creative talents. Although it is very difficult to find writers who will say specifically what a suitable sample size is in qualitative research, Mason (2010) cites a number of writers who make recommendations about sample sizes in qualitative research. In phenomenology, Creswell (1998 p.64 cited in Mason, 2010) recommends five to 25 and Bertaux (1981) states that fifteen (15) is the minimum acceptable sample size in qualitative research. In total 18 children were sampled for the experimentation and took part in all experiments including the controls: this is the number of children in the class that was chosen for the experiments.

#### **4.2.1.2 The Age**

The age of the pupils was 12 years, specifically year 6. The experiment will include a comparison between drawings produced under the different types of involvement by teachers, where such variables are tested alone, in combination and all together and drawings produced without any involvement variables towards establishing how the different types of involvement have an impact on creativity. Therefore, it is required that an age group is sampled that already show signs of pedagogical influence in their work, where such pedagogical influence is a result of instruction, engagement and evaluation. Children at this age have established ways of being artistic that often take place under the supervision of a teacher (Lowenfield and Brittain 1982, Fordon 1998, Fawson 2009). Other age groups are not included because the study does not aim to make a comparison between different ages.

In terms of artistic ability, it was decided to pay no attention to different levels of skill. The reason for this is that the study is not interested in ability in terms of skill; the focus is on creativity and developing drawings that are not influenced by adults.

#### **4.2.1.3 Gender**

All of the participants were male because male and female pupils are different in terms of their development. There is much in the literature (Baer and Kaufman, 2008, Bart et al., 2015, Tsai, 2013) that shows that creativity is different between the genders in education and work settings. Specifically, Tsai (2013) showed that boys excelled girls in terms of creative performance and Karwowski et al. (2013) said that differences in personality traits between male and female contribute to creativity. Therefore, if both genders were involved this would introduce another variable that the study is not seeking to address and it would have a negative impact on reliability and validity of the results. Creativity has clearly been shown in the literature to be different between the genders, and therefore, experimentation with both genders would be a significant threat to the reliability of the experiment.

#### **4.2.1.4 Ethnic Background**

All of the participants to the experiment are ethnically Arab from the same region of Mecca. This was to ensure that all of the participants came from the same ethnic and cultural background and have the same cultural values. It was also important that they had similar educational backgrounds. The reason for this was to reduce the variability in the sample: for example, there are schools in the Jeddah region where the pupils are from a wide variety of backgrounds such as African and Asian as well as Arab, and such differentiation in background could have an effect on the reliability of the results.

### **4.2.2 Factors of The Experiments**

There are a number of experiment factors that if not carefully considered will have a negative impact on the validity of the results. These factors include the brief, techniques and materials and location. There is an explanation and justification for consideration of these factors towards achieving the aims of the study.

#### **4.2.2.1 Techniques and Materials**

The technique will involve children drawing on paper using a simple black pen and paper technique according to the principles of (Dubuffet). This approach was chosen because a multitude of choice of materials can have an impact on creativity (Roth, 1996) and the present experiment is not concerned with materials as a variable.

The first reason is that we want to reduce the variables in the experiment. With this technique there will be no scope for using different colours and different techniques such as shading, the reason this is important is

because the research does not want to introduce new variables of creativity that would then have to be measured.

Secondly, there is evidence in the literature that this technique offers a number of benefits in relation to children and their creative ability and imagination. Although it has been suggested (Pavlou, 2009, Roth, 1996) that a limitation of the availability of materials can play a role in the children's design, such a problem is not necessarily an issue. This has been affirmed by these two authors (Pavlou, 2009, Roth, 1996) who say that when children face difficulty due to restriction of materials, especially when they are trying to create representational work, they adjust their ideas according to the availability of materials (Pavlou, 2009); and Roth (1996) says that a restriction in materials will cause children to try to exploit the materials that they do have and will not interpret the availability of materials as restrictive. Therefore, the limitation in the materials for the reasons that have been described above will not have a negative impact on the creative process, but rather it will help the children to be more creative because they have to use their imagination and initiative more.

#### **4.2.2.2 Brief**

From the primary research with teachers and analysis of the curriculum, and the review of the literature, as explained above, one of the variables in the experiment was established as instruction, thus the study aims to investigate the effect that instruction has on creativity. The children will be given briefs which will comprise the instruction variable when it is being tested.

The curriculum document analysis revealed certain factors about the instruction or briefing that teachers gave to children: that the instruction contains information about what children have to do and included the subject or theme for that particular exercise.

Towards improving validity, overall, the experiments are designed to reflect as closely as possible a normal art class situation. This is achieved through conducting the experiments in the same time and setting, and with the same teachers, as the real classes. This includes the brief, as part of the instruction variable, in the experiments. Validity here is achieved through giving children the same subjects that are found in the curriculum. The analysis of the curriculum showed that there was an emphasis on Islamic and cultural artistic heritage to be reflected in the work. Examples included architecture, where children were requested to draw a mosque or a traditional house, and Islamic symmetrical art, as well as the natural environment in Saudi Arabia such as the desert and the sea.

### **4.2.2.3 Location and Duration**

It is important to remember that the experiments are going to take place in a school environment. Because the experiments are designed to test certain established potential influences, children should not be aware that an experiment is taking place. Therefore, the experiments will take place in the normal art classes in the same location and at the same time as normal timetabled classes. Although many argue that the environment stimulates a child's imagination (Cassou, 2004), any attempt by the researcher to change the location would be seen as influence: therefore, the location will remain the art classroom in the school. Moreover, the layout of the classroom will not be changed and will be the same as a normal class.

The duration of the experiments will be 90 minutes because this is the duration of the normal art class. The questionnaire with the teachers addressed how the time was allocated in each session within this 90 minute timeframe, in terms of the time given for instruction, time for drawing and working collaboratively with the teacher. The experiments test the variables according to the same structure of a normal class. There was one experiment per week for a period of 9 weeks.

## **4.3 Experiment Development**

This section will show how the experiment is developed. Specifically, it begins with development of the experiment variables, which are based on types of involvement, which have been derived in the primary and secondary research. Thereafter, the design of the experiments, which includes the inclusion and exclusion of the variables in different combinations to test their impact on creativity, is presented.

### **4.3.1 Experiment Variables**

From the primary research, a number of potential influence factors were revealed which, for the purposes of inclusion as variables in the experiments, were categorised as instruction, engagement and evaluation. Teachers took part in a questionnaire and interview to determine the extent and type of involvement and how the curriculum informs this. The results showed that teachers were found to be involved with children in all aspects of the artistic process and that there were numerous instances where teachers were involved with children: these included introducing and discussing a central idea or topic, feedback, suggestion, discussion, encouragement, assessing, judgement and their opinion, all of which were categorised under either instruction, engagement or evaluation. These factors of teacher involvement have been identified in the literature to have a negative impact on the creativity in children (Roth 1996, Einarsdottir et al., 2009, Gardner 1990, Rose et al., 2006).

The primary research also revealed a structure to the class which was comprised as the initial part of the class where children are introduced to the topic and instructions are given, a middle part where children engage in art activity and teachers are involved through offering feedback and encouragement, and a latter part where work is assessed by the teacher. The aspects of teacher involvement, identified as potential influence factors, are found within and can therefore be categorised under these three main stages, i.e. instruction, engagement and evaluation.

Specifically, during the observation of the class by the researcher a clear structure emerged within the stages of which the different types of involvement were observed. Therefore, where the teacher offers advice, gives feedback and has a discussion with the child this comprises the engagement stage of the class, and this type of involvement within this stage have to been shown to influence creativity. Likewise the instruction stage was observed which is comprised of giving instructions, which was also revealed in the research to have an influence on creativity, the same was true for the evaluation stage. Therefore, by categorising the different types of involvement under the three main stages of a class this is more reflective of a normal class structure that children would experience, which is the phenomenon that the study is concerned with investigating. Moreover, the present is not concerned with testing the individual factors of involvement found within each stage.

#### **4.3.1.1 Instruction**

The primary and secondary research revealed instruction as a significant part of the art classroom and as a potential influencing factor on creativity. In summary, instruction is about what is expected of the children and may have an influence and the literature supports that an absence of specified instructions can affect creativity in children. Roth (1996) says that teachers influence children by setting constraints and what is to be created; Freeman (1980) says that if a child is provided with stimuli it will influence a child to a certain extent. Moreover, towards achieving greater creativity and fostering self-expression Franz Cizek (1936) created an environment where instruction was non-existent.

The primary research in this study shows that much session time is dedicated to giving instruction and introducing, discussing a central idea or topic and giving example, which may be a form of influence. Moreover, the teacher stated that a negative influence on the child's ability to concentrate was the receipt of instructions.

The analysis of the curriculum revealed that a major aspect of the class was instruction whereby children were given the aim of the lesson and provided with existing examples of art. The reason the curriculum



emphasises examples is for children to assimilate the style of the art in their own work in order to increase their artistic ability.

Therefore, instruction was established as one of the variables of the experiment. Where instruction is included as a variable to be tested then normal instructions will be given to the children through introducing and discussing a central idea or topic as they would normally in an art class, the teachers will be briefed about this. Moreover, because the study is interested in the effect that instruction has on creativity there are experiments where it is excluded for comparison purposes. However, it is important to understand that absolute no instruction is impossible to achieve since the children need to be given some idea of what they have to do. Therefore, where instruction is removed as a variable it does not mean the complete absence of instruction but instead there will be minimal instruction, teachers will be briefed to simply tell the children to draw whatever they want. This is in line with the 'pen and paper' principle, the minimum necessary instructions should be given; according to the principles of Dubuffet the children should be given a pen and paper and left alone. Importantly, the ideas of minimal stimuli as proposed by Torrance and Freeman are rejected here because they go beyond what is required in the simple pen and paper principal by offering an initial stimulus.

There are two situations where instruction is tested as a variable, which include the control experiments and the main experiments. Where instruction is not tested, there will be a brief that reflects the idea of 'minimal' instruction, as not saying anything to the children at all is not practically feasible. Here children will simply be asked to draw anything.

In the main experiments instruction is tested for as a variable in experiment 2 where it is tested alone, experiment 3 where it is tested in combination with engagement and with evaluation in experiment 4. Each of these experiments where instruction is included as a variable a different brief will be used. As mentioned in the above children will be briefed the same subjects in the experiments as they are normally briefed in the classroom as part of curriculum requirements. For experiments 2 and 3 the theme was architecture, specifically a mosque and architectural heritage respectively, experiment 4 included Islamic symmetrical art. For the control experiments, 1 and 9, the theme was the sea and children were asked to draw something from under the sea or on the sea. Experiments 5,6,7 and 8 did not include themes as instruction was not tested.

#### **4.3.1.2 Engagement**

The primary and secondary research has revealed a number of types of involvement that the teacher has with the child, which have been categorised collectively in this study under the engagement variable. Specifically, these types of engagement included feedback, suggestion, discussion and encouragement.

The literature has shown that these types of engagement have both a negative influence and sometimes a positive influence (Gardner, 1990, Pavlou, 2006, Garaigordobil, 2006, Rose et al., 2006, Roth, 1996, Einarsdottir et al., 2009, Burnett and Mandel, 2010, Cassou, 2004, McArdle, 2001).

The teachers took part in a questionnaire to determine the extent and type of involvement of adults and how this is related to or affected by the curriculum. The results showed that teachers were found to be involved with children in all aspects of the creative process and that there were numerous instances where teachers were involved with children; these included encouragement, suggestion, feedback and discussion with the pupils.

The teachers involved in the experiments where the engagement variable is tested are briefed to engage with children through encouragement, discussion, feedback and making suggestions as they would normally in an art class. Likewise, for the experiments where engagement is excluded teachers will be briefed to refrain from engaging with children in these ways.

In reference to aspects of engagement, the curriculum analysis revealed the procedure of the lesson, which includes providing and discussing examples, discussion of work produced by the children, feedback, encouragement and motivation.

The engagement with the children was the main part of the class and lasted for the same time as a normal class, which was revealed in the primary research.

In summary, the research, both primary and secondary, suggests that types of engagement can have a mostly a negative, and sometimes a positive, effect on creativity in children. Therefore, it is the intention of this study to experiment to determine these effects.

#### **4.3.1.3 Evaluation**

The secondary research has revealed that the pressure on the child to perform and the fact that they are aware they are being assessed against criteria has an effect on creativity (Amabile, 1996, cited in Baer & McKool, 2009). Cassou (2004) says that children should not plan and be focussed on the outcome because the orientation is towards achieving rather than creating and spontaneity and there should be no criticism or evaluation because it could be damaging to the child. Amabile (1998) says that one of the inhibitors of creativity is evaluation where there may be inequitable evaluation and feedback mechanisms and unrealistic expectations.

The primary research revealed that the teachers felt that their personal opinion was most suited to judge the children's creativity. The majority of the teachers were of the opinion that they were good judges of the

children's creativity and they indicated that they give judgements to the children. Additionally, teachers felt that the standards and outcomes that were set out in the curriculum were suitable for evaluating the child's creative ability.

In order to test the effect of the inclusion of evaluation in the experiments the children were informed that their work would be evaluated. The teacher will be informed that they have told the children that their work will be evaluated.

The teachers involved in the experiments where the evaluation variable is tested are briefed to evaluate with children through assessed, as they would normally in an art class. Likewise, for the experiments where evaluation is excluded teachers will be briefed to refrain from evaluate with children in these ways.

### **4.3.2 Design of the Experiments**

Once the experiment variables have been established it is necessary to design the structure and procedure of the experiment that will be used to test these variables. This section is concerned with presenting the structure and procedure of the experiment, which includes the number of experiments and combinations of variables, experiment piloting, the briefing of the teachers to ensure they engage the class according to the established variables and sampling.

#### **4.3.2.1 Experiment Procedure**

The main purpose of the experimentation is to test the identified aspects of the presence and involvement of adults as variables that may have an effect on creativity in children. Specifically, as identified in the literature, approaches to participatory design and primary research with teachers, these aspects are categorised within instruction, engagement and evaluation as overall factors of involvement.

These aspects are hypothesised as negative aspects because they represent adult involvement and influence to which the study is aimed to show have a negative impact on creativity in children. Therefore, in order to verify that the presence of these aspects as negative influences will negatively affect creativity, as hypothesised in this study, the experimentation will test the effect of these aspects. For example, the aspects discussion, feedback and encouragement are investigated collectively under the variable of engagement.

An experiment involved the children drawing with the inclusion and exclusion of various types of adult involvement as influences to investigate the impact these variables have on the creativity of children engaged in art. It is important to note that the experiments will take place as normal art classes at the same time as

normally timetabled in the usual classroom locations so that the children are not aware that an experiment is taking place.

#### **4.3.2.1.1 Briefs**

The researcher may not have a presence in the experiments because it would be an influence on the children. Unfortunately, the researcher therefore, has to find some way to ensure that the teacher engage with the children in the way intended according the variables established in this study. The presence of a researcher would certainly decrease the reliability of the results, however, if the teacher does not engage with children in a way that they should do then, this is another threat to the reliability of the results. Therefore, this required a solution whereby the teacher would conduct the class as per the requirements of the experiments while at the same time not requiring the researcher to be present.

The solution was for the researcher to brief the teacher about the three variables and the different types of involvement that are found within these variables, for example, discussion, feedback and encouragement within the engagement variable and brief the teacher about how they should approach these variables in the experiments. It is important to note that the three variables and what they entail have been derived from the teachers in the first place during the questionnaires and interviews, and therefore, during the briefing it is expected that the teacher will be familiar with these variables. Moreover, the brief does not offer exact details of how teachers should, for example, offer encouragement or provide feedback, teachers will be asked to do this in the way that they normally do in class. The reason for this approach is that the overall intention is to duplicate a real classroom situation where children are usually engaged in art activities towards achieving increased credibility. For the engagement variable this is particularly important because the teacher will be required engage the child in ways that they would do normally through, for example, offering suggestions, feedback and encouragement. As for the instruction variable, where it is tested, the teacher will be requested to present a brief in a normal way according to the requirements of the curriculum. The evaluation variable will simply require the teacher to inform the children that their work will be evaluated according to the requirements of the art session. It is important to note that the teachers who took part in the experiments were not the same teachers who took part in the questionnaires and interviews, nor were they the teachers who took part in the evaluation.

#### **4.3.2.1.2 Pilot Study**

Once the teacher has been briefed and understood their role in the experiment and how they should conduct themselves, they participated in a pilot study for the experiments themselves. The pilot study was conducted to further ensure that the teacher understood the experiment procedure and what was required of them in

terms of conducting the class according to the three stages instruction, engagement and evaluation and the individual factors found within each variable. This is to ensure the validity of the tested variables, where for example, engagement would not be complete with the absence of certain factors such as encouragement or suggestion. Moreover the pilot study serves highlight any practical issues that may arise. Moreover, the purpose of a pilot study is to identify any flaws and to smooth out any problems; and this significantly increases the credibility of the study (McBurney and White, 2007).

In order to achieve the pilot the teacher was requested to take part in three pilot experiments, specifically, one experiment including all variables, one experiment including one of the variables and one experiment with a combination of two variables. The researcher observed the teacher conducting the class. It is important to note that the children who participate in the pilot study are the not the same as those who took part in the main experiments, the reason for this is that the researcher is present as an observer and this could result in the children being influenced as the presence of the researcher will be an indication that experimentation is taking place.

The results of the pilot study showed that the teacher clearly understood how to conduct the class according to the requirements of the three established variables and the associated experiment procedure.

#### **4.3.2.1.3 Sampling**

The study sample for the child participants comprised of a total of 18 male primary school children of 12 years of age, year 6 in Saudi Arabia. They were sampled from one school in the Mecca region. There were a total of nine experiments using the same children, producing a total of 162 drawing samples.

#### **4.3.2.2 Experiment Structure**

There are two sets of control experiments, which are designed to see if there are changes in creativity as the children progress through the experiments. The first set, experiments 1 (control 1) establish the state of the children in terms of creative ability under the influence variables before the main experiments begin. The final set of control experiments 9 (control 2) are designed to see if there any changes after all main experiments have been completed. In order to evaluate any change in the pupils' creativity, the results of these two sets of control experiments are compared. Therefore, it is essential that for all two sets the same brief will be given in order to ensure consistency.

The experiments were designed to test all of the three variables. Specifically, the variables, which include instruction, engagement, and evaluation, are tested individually and in the possible combinations with other variables. To provide an example, consider the variable 'instruction' this variable is tested alone (Experiment

2) and it is also tested in combination with the variable 'engagement' (Experiment 3), and in combination with evaluation (Experiments 4), and finally, in combination with all variables (Experiments 1 and 9). These combinations are applicable to all three variables 'instruction', 'engagement' and 'evaluation'.

Moreover, there are experiments that are designed to test the effect where none of the three variables of adult involvement are included (instruction, engagement and evaluation), which are reflective of a situation where there are no adults, present (Experiments 8).

The experimentation involves generating data by manipulating variables that are the causes, these are the independent variables and to observe the effect that this manipulation has on the variables (dependent variables) that are affected by the causes (Walliman, 2011). This research is concerned with causation and thus it is important to control for the effects of the variables, which means to hold them constant so that causality can be attributed (Cohen et al., 2011). In this study the independent variables are the three types of teacher involvement, namely; instruction, engagement and evaluation, and the dependent variable is the resulting creativity that is being tested. In order to check that the assumptions on which the experiment is based a control can be introduced; this will include an identical setup. However, the independent variables are not manipulated (Walliman, 2011). In this study the independent variables are not manipulated so that for the control experiments there is the inclusion of instruction, engagement and evaluation as the study is concerned with their exclusion either individually or collectively.

There are control experiments, which will include all three variables. In experimental research causal relationships between phenomena are explicated through intervening in the natural setting and then controlling the variables (Scott and Usher, 2000). One approach includes the use of a control in order to make a comparison between the control group and the experimental group (Scott and Usher, 2000), here the experimental group is the group experiencing the intervention and the group that does not experience the intervention is the control group (Newby, 2014). There is a need to control variables that may affect the phenomena that we are trying to study or cause spurious interpretations of the relationship (Punch and Oancea, 2014). Essentially the type of control that is taking place is a physical control rather than a statistical control (Punch and Oancea, 2014).

At the beginning of the experiments a control experiment is conducted (Control 1), this is in line with the experimental method of using a control group for comparison purposes (Scott and Usher, 2000). Additionally, to see if there is any influence during the experiments, i.e. A control is conducted at the end of each experimentation, Control 2. The experimental method here tests the effect of an intervention (Scott and Usher, 2000) Table 4-1.

Table 4-1 Design of the Experiment

Experiments	Control / Variable	Involvement of Adults (Variables)		
		INSTRUCTION	ENGAGEMENT	EVALUATION
Experiment 1	Control 1	✓	✓	✓
Experiment 2	Variable 1	✓	✗	✗
Experiment 3	Variable 1+2	✓	✓	✗
Experiment 4	Variable 1+3	✓	✗	✓
Experiment 5	Variable 2+3	Minimal	✓	✓
Experiment 6	Variable 2	Minimal	✓	✗
Experiment 7	Variable 3	Minimal	✗	✓
Experiment 8	No Variables	Minimal	✗	✗
Experiment 9	Control 2	✓	✓	✓

After the design and development of the experiments, based on secondary and primary research, the experiments were successfully conducted. The experiments were run as a normal art class that normally takes place in the school, the experiments took place at the same, for the same duration and location each week. The children produced drawings and no problems were faced in conducting the experiment. The teacher performed their role as expected.

## **4.4 Evaluation**

A very important consideration in this study is how to assess the children's drawings. It is necessary that the adopted tool can verify the levels of creativity and that the drawings show signs of being 'pure' under the various experimental conditions which are designed to reflect different types and levels of influence.

The experiment will involve allowing children to draw under different experimental variables and then assessing the outcomes. It is therefore important to consider tools that are used to assess creativity. The literature review provides many of the ideas about creativity and in this chapter the potential tools that could be used to assess creativity are considered. The selected tool will be used for a comparative evaluation of creativity of drawings produced under the various experimental variables.

### **4.4.1 Rhodes Creativity**

Many researchers have been influenced by the four-part approach to creativity, which was first proposed by Rhodes in 1961. Runco (2004) says the approach of Rhodes towards creativity considered a distinction between the creative person, process, product and press. The 'product' refers to research that judges products on their novelty and their appropriateness and the creativity of a product is often defined and evaluated according to a socio-cultural definition. The 'person' refers to studies that focus on the personality that are associated with creativity, within this people are deemed to be creative from the individualist definition or from the fact that they generate creative products. The 'process' approach to research involves creative work or creative thought, and finally, 'press' which is research that focuses on external pressures or forces that have an effect on the creative person or process, this could include the cultural and social context (Sawyer, 2014).

In reference to the meaning of 'press', Rhodes (1961/1987 p.220) says that it is the relationship between people and their environment and that press refers to influences that may be general and operate through valuation and tradition, examples of these influences would be the culture, an organisation or even the family, or such influences could be even more specific and include environmental settings or interpersonal exchanges (Runco, 2004). The latter is related to the variables being tested in the present study: the interpersonal exchanges acknowledge the instruction, engagement and evaluation variables.

#### **4.4.1.1 Criticism**

A criticism of Rhodes' approach to looking at creativity in terms of the four Ps is given by Barron (1995, p.32), who says that the downside of this approach is that there is a strict separation between the four Ps



which is seen as an oversimplification, because in reality three of the Ps product, process and person are actually interconnected in all creative activities.

Another critic of Rhodes' four P's was Glaveanu (2013), who said that although it was an approach to creativity that helped researchers to structure their thinking, it supported an individualistic, static and disjointed view of creativity. As a response, Glaveanu (2013) offered a framework that rewrites this approach by using terms that promote a more systematic, dynamic and contextual approach to creativity through the 5 As framework. Specifically, the five As are: actor, action, artefact, audience and affordances. Glaveanu (2013) said, in reference to the work by Rhodes, that Rhodes was perplexed by the definition of creativity and collected more than 40 different definitions of creativity for analysis and concluded that there were four distinct strands, namely the 4 Ps. However, these four strands were derived from concepts that were not necessarily mutually exclusive and although they are each academically interesting, they only function in unity (Glaveanu, 2013).

It is important to note that Glaveanu (2013) does recognise the contribution that Rhodes has made and the numerous extensions and elaborations that have been made and that Glaveanu (2013) also aimed to rewrite and expand the initial four Ps offered by Rhodes. Moreover, there is the idea that Rhodes' work is based on theory and the study of definitions: this is evidenced by the fact the original intention of Rhodes was to organise the diversity of formulations. In response to this criticism, Glaveanu (2013) offers an approach that does not try to structure existing theory but rather tries to inspire its development towards moving away from models that are based on excessive specialisation and fragmentation. Specific criticisms that are put forward by Glaveanu (2013) include the fourth P of 'press', which is about the relationship between the person and their environment, which is perceived as the social environment. There is a problem with the term itself as it suggests that there is a pressing influence on the creator and their work.

The ideas of process, product and press do not conflict with the present study: however, there is a potential conflict with the idea of the person. According to Runco (2004), the person refers to research on personal characteristics and includes studies on personality and the traits that are characteristic of creative people (Runco, 2004). Here there is an indication of characteristics of creative people, implying that some people are creative and some people are not. This contradicts the present study, which adopts the democratic view of creativity where all people are capable of creative achievement as opposed to the elite view of creativity (Robinson Report, 1999), which seems to be the approach considered by Rhodes.

To summarise this study, it adopts the principles from Rhodes that are relevant to the study. Specifically, from the four Ps put forward by Rhodes, process is about the creative process itself: in this study, this process

takes place with established variables. The product is also something that this study considers, as a product that reflects creativity to be measured.

#### **4.4.2 Torrance Test of Creative Thinking (TTCT)**

TTCT is a well-known and widely used test for measuring creativity and includes both figural and verbal subtests: the TTCT-Verbal and the TTCT Figural, namely A and B forms (Kim, 2006). The figural subtest has two parallel forms, with three subtests which include: compose an drawing; finish a drawing; and compose a different drawing that parts from parallel lines. This test is designed to assess the four cognitive processes of creativity (Almeida et al., 2008). TTCT was the first test that offered a physical measure for creative levels and offered an insight into creativity, as long as the test is used by qualified professionals because variation in the testing can affect the scores (Kim, 2006). TTCT was developed in 1966 by Torrance and has been revised five times since (Kim, 2011b).

TTCT has been widely used in the field of education and is considered the most widely used test for creativity (Kim, 2006). Examples include Darvishi and Pakdaman (2012), who measured creativity in primary school children and found a slump in creativity in the 4<sup>th</sup> grade, and Rudowicz et al. (1995) who measured creativity in Hong Kong primary school children in comparison with other studies, using TTCT for cross-cultural analysis.

Included in the scoring are thirteen criterion-referenced measures which are referred to as creative strengths by Torrance. These include emotional expressiveness, storytelling articulateness, action or movement, expressiveness of titles, synthesis of incomplete figures, synthesis of circles or lines, unusual visualization, breaking or extending boundaries, richness of imagery, humour, colourfulness and fantasy (Kim, 2006). As the TTCT was developed over time, these sub scales were developed, added to and justified by Torrance who used research to achieve this including studies that were by the ‘creative giants’ (Kim, 2006, p. 5), personality studies about creative people, training guides for creativity, other studies carried out by himself as well as other literature in the area of creativity (Kim, 2006).

Creativity has been defined by Torrance (1969) as the ability to find gaps, propose solutions to problems, come up with novel ideas, re-combine them and have an intuition for a novel relationship between these ideas. Moreover, in reference to dimensions, processes have been defined that have been assumed in assessing creativity which include: fluency, which means the production of ideas; flexibility which is related to producing different ideas; originality which means to produce ideas that are unusual; and finally, elaboration which is about introducing detail into products.

As mentioned in the above, the TTCT – Figural has two parallel forms A and B comprising of three activities which include picture construction, picture completion and repeated figures of circles or lines (Kim, 2006).

#### **4.4.2.1 Criticisms**

While there are many ideas and definitions about the idea of creativity and what is the best way that it can be assessed, it is widely accepted that TTCT, as a tool that is used internationally, is best for the measurement of creativity, however, there have been studies to determine its validity. Almeida et al. (2008) conducted a study involving three experiments to analyse the validity of TTCT. They started with the premise that they expect the cognitive dimensions of creativity which are flexibility, fluency, originality and elaboration, to be stable and consistent when student performance was assessed using TTCT. However, the results of their study found that there inconsistency in the four cognitive processes as factors for assessing creativity. Specifically, these factors were related to the tasks in the experimentation in an independent way (Almeida et al., 2008).

Further reference to reliability and validity as a criticism of TTCT has been offered by Kim (2006) who says in reference to the TTCT-Figural that there has been no reports on reliability and validity for the latest version in 1998. Moreover, Kim (2006) also argues that there has not been consideration of demographic characteristics such as race, gender and community status, and it is possible, for example, that the originality scores of various demographic groups may vary over a period of time, additionally, there be a difference in responses between cultures supported by the idea that originality is culture specific (Kim, 2006).

Further criticisms of the TTCT come from Baer (2011) who, although he supports the idea of using multiple measures for ability, especially for measuring creativity, does not endorse the idea of a tool that lacks validity, a problem that is associated with TTCT, something that Baer (2011) says is agreed upon by many authors who also endorse and propose the use of multiple measures of ability but have not found TTCT to be a valid tool (Baer, 2011). However, this challenge to the validity of the TTCT has been criticised by Kim (2011) who said that the criticism that Baer has presented should not be based on evidence that is taken from other divergent tests which Baer does (Kim, 2011).

The TTCT is based on divergent thinking which is based on the idea of the ability to generate different responses to a task where such responses are scored according to: the fluency which represents the quantity of responses; the flexibility which is the number of the different kinds of responses; originality; and finally, elaboration which is about the detail in the responses (Baer, 1994). The main reason that the popularity of divergent-thinking tests has declined is been related to issues validity and a failure of the test scores to reflect real-world creativity (Baer, 1994). However, validity of the testing device is not the only issue: another

criticism is that cognitive studies have shown that creative ability can differ from task to task, although it would be beneficial for both educators and those interested in creativity if there was a single class of thinking skills like divergent thinking that could be used across all the different types of tasks. However, the research suggests that this is not the case and there is a need for a task-specific view of creativity (Baer, 1994). In response to this criticism and in pursuit of a task-specific approach, Baer (1991, 1992, 1993) conducted a number of creativity studies where participants were asked to complete story, poem, collage and mathematical problems where experts in each field were asked to judge creativity using the consensual assessment technique (CAT) created by Amabile (1983).

Another criticism that was put forward by Baer (2011B) is that the TTCT measures divergent thinking in certain narrow domains but it is commonly thought that the TTCT is a more general test of creativity, which evidence does not support. This relates to the aforementioned criticism that a creativity test that, for example, measures creative things that can be done with a tin can, is creating a warped view of creativity (Baer, 2011B).

Torrance proposed a tool that is based on multiple measures and was certainly not in support of the use of single score, moreover, he was in support of looking for patterns among subscores in order to gain more insight into individual abilities (Baer, 2011). However, these intentions are not often how the tests are actually used. This is because overall scores are considered without any reference to sub scale scores and where there should be consideration of the relationships between these sub scores, however, they are treated as individual measures of creativity (Baer, 2011). This is disappointing because nuanced interpretations of these sub scale scores may offer insight into the creativity of individuals (Baer, 2011).

Kim (2006) also offers criticism in a review of the figural TTCT tool. One of the criticisms is that the TTCT does not completely operationalize the definition of creativity by Torrance, and it is also important to note that Torrance himself never actually claimed that his tests could assess all of the different dimensions of creativity. Moreover, Torrance never claimed that his test should be used alone as the sole tool for making decisions about creativity (Kim, 2006). To support this idea, Torrance (1974) himself said that scoring highly on the TTCT is not a guarantee that a person can behave creatively.

An interesting point that has been made by Torrance that is relevant to the consideration of using the TTCT in the present study is that Torrance (1990, 1998) and Torrance and Ball (1984) say that creative motivation and skills in addition to creative ability are required in order for creative achievement. Clearly, here there is a reference to the issue of skills and even creativity ability, something that the present study rejects in terms of the fact that it believes that all individuals are creative in their own way. In this regard, the study adopts the premise of the 'democratic' definition or view of creativity as opposed to the 'elite' view (Sharp, 2004).

The democratic view of creativity is that all people are capable of creative achievement and that everyone should be allowed to achieve according to their own abilities (Robinson Report, 1999). The elite view on the other hand sees that only a few rare people are creative and that they have unusual talents (Robinson Report, 1999). Moreover, the present study is not concerned with saying whether or not someone has creative ability, but rather is concerned with measuring increase or decrease in creativity within all individuals under the various experimental conditions.

Moreover, in the figural approach of the test, there are a number of exercises that include for example picture completion and Freeman (1980), in work related to minimal stimuli with children, showed that the stimuli, such as a straight line, has an effect on the drawing outcomes. Therefore, this has been shown to be a form of influence, something that the present study needs to avoid beyond the established influence that is being experimented for.

To summarise, there are a number of criticisms of TTCT which include reliability and validity, lack of consideration of the effect of the different types of task and the fact that subscales are not considered and only the overall score is considered, to name a few. Moreover, the test itself is designed in a way that includes potential forms of influence: firstly, through establishing an atmosphere which is fun; and secondly, through providing children with stimuli. Unless these factors of influence are going to be experimented for by including them as variables, then they should be excluded from the study.

#### **4.4.3 Consensual Assessment Technique (CAT)**

A critic of popular creativity tests, which includes TTCT, and other subjective assessment techniques was Amabile. Amabile (1982) felt that these approaches were not suitable for social psychological studies of creativity and present a consensual definition of creativity. Amabile introduced the Consensual Assessment Technique (CAT). One of the main assumptions of CAT is that the judges should agree that some products are more creative than others (Thang et al., 2008). The tool requires that the judges are experts in the relevant area with their own assessment criteria and subjective ideas about creativity when passing judgement (Thang et al., 2008).

When using CAT, it is very important that the expert judges assess the work independently of each other in order to avoid influencing each other. Judges are asked to rate the creativity on a given scale. The range of scale used can be flexible but must include at least three points, and judges should not be expected to justify or explain their score (Baer & McKool, 2009). The results can only be compared with other results for the same products and not with an external standard.

According to Baer and McKool (2009), in CAT there should be no attempt by the judges to measure the skills or attributes which are theoretically attributed to creativity, but instead they should look for the actual creativity, in what the pupils have produced. More simply, the focus is on the creative products rather than creativity-related talents or attributes. It is necessary to assess something that is recognisable and measurable. Baer and McKool (2009) cite Csikszentmihalyi (1999, p.314) as follows:

*'If creativity is to have a useful meaning, it must refer to a process that results in an idea or product that is recognized and adopted by others. Originality, freshness of perception, and divergent-thinking ability are all well and good in their own right, as desirable personal traits. But without some sort of public recognition they do not constitute creativity. . . The underlying assumption [in all creativity tests] is that an objective quality called 'creativity' is revealed in the products, and that judges and raters can recognize it'.*

Baer and McKool (2009) summarise this point by stating that instead of measuring things that might be attributed to creativity or are considered predictors of creativity, CAT goes straight to the heart of creativity by looking at the creative or non-creative products which have been produced. The CAT method does not claim to measure creativity-relevant abilities because it has been argued that they do not exist and thus cannot be measured (Baer & McKool, 2009).

However, there are disadvantages to using CAT. There is a risk that an expert judge might rate the drawings' creativity using previously established criteria for creativity which may be derived from or form part of teaching curricula. Rather, it is the intention of this study to use the creativity assessment instruments to assess whether or not the work shows signs of creativity. Moreover, although CAT has been shown to be a suitable and accepted way of collecting judgements about creativity, it is limited in the sense that it does not allow elaboration in judgements (Thang et al., 2008).

#### **4.4.4 Creative Product Semantic Scale (CPSS)**

Besemer had a passion for products in terms of the beauty of their form, function and design, and was curious about how people evaluated creative products. She felt that people were very critical and quick to judge products (Besemer, 2006) and judgments are based on intuition, and while the intuition is based on internalised important criteria formed from extensive experience in some judges, there is a need for accountability and objectivity which requires more explicitness in judgment (Besemer and O'Quin, 1999). Moreover, O'Quin and Besemer (1989) say that much of the literature is based on the creative personality and creative processes, and to a lesser degree the product itself, but in order to understand creativity and the creative process the product should be used as a reflection. In this research field there has been a long tradition of assessing creativity by studying the products which result from the creative process. This is because the

products are seen as a dependent variable of the creative task and are a reflection of a person's creative performance (Besemer, 1998).

Besemer (1998) set out to see if a judging instrument can be used to discover perceived differences in creative products being judged by non-expert judges. Besemer came to realise the subjective nature of creativity and therefore developed evaluation criteria which were grouped into three dimensions; Novelty, Resolution and Elaboration and Synthesis. These three dimensions were developed into a three-dimensional model called CPAM (Creative Product Analysis Model) which was a generalised theoretical framework to understand creative products. The aim of research using CPAM has been aimed at the development of a research instrument to consider and describe creative products, this instrument can be used by product designers, engineers and students and CPSS is the evaluation tool based on this model.

The Creative Product Semantic Scale (CPSS) was developed by Besemer and O'Quin in 1987 which was based on the three dimensions which are assessed using a semantic-differential rating scale. CPSS does not require experts to assess the products because inter-rater agreement among untrained graduates was shown to be high when assessing the creativity of Picasso drawings and geometric designs, judges need to merely need to apply their subjective understanding (Hennessey, 1994).

The development of CPSS was based on research on the theoretical framework of CPAM which initially used 110 item check list, further to this, other studies sought to verify the three theoretical dimensions of CPAM (Novelty, Resolution and Elaboration and Synthesis) also employing the same 110 items but on a 4 point descriptive scale (O'Quin and Besemer, 1989). However, because of problems related to measurement, a shorter instrument, namely; CPSS was developed using the theoretical matrix of CPAM (O'Quin and Besemer, 1989). CPSS contained 71 bipolar adjective pairs which are divided into 11 subscales each of which measures the three dimensions.

CPSS looks at how well the designed product is crafted, its originality and its appropriateness. The scale has been developed for use by non-experts and consists of 55 bipolar adjective item pairs which are divided into the three different dimensions; novelty, resolution and style (Thang et al., 2008).

One of the main advantages of CPSS in relation to this study is its adaptability, because researchers cannot agree what attributes or combinations constitute a creative design, the instrument allows researchers to select specific subscales based on what they are investigating.

The CPSS instrument is an instrument for assessing the creativity that is perceived to be apparent in a product. Another advantage of the fact that the approach can be used by untrained (non-expert) judges is that it

demystifies the idea of creativity in products, making it something that anyone can understand (Besemer & O'Quin, 1999) or appreciate.

CPSS is administered in a group setting and it takes approximately 15 minutes to evaluate a single product, however, this time frame is for the full CPSS tool which includes 55 adjective pairs, this study will use less because the Resolution dimension has been removed. It uses a Likert scale scoring approach rating adjectives between 1 and 5; for example, old – new (Besemer & O'Quin, 1999).

An explanation of how the score is derived for each subscale is provided in the study by Besemer and O'Quin (1999). The method takes the mean of all of the items listed under a subscale. Examples of a subscale and the associated items provided in Besemer and O'Quin (1999) study is that the subscale for Elegant has the items (these are the pairs of adjectives that are placed on the Likert scale) Harmonious - jarring, graceful - awkward, charming - repelling, elegant - coarse and attractive - unattractive.

Besemer (1998) says the implications for the application of this instrument, CPSS, extend to validating the instrument in a culture outside of Europe, moreover, it could be of use for those who are interested in other areas of creativity research.

However, there are limitations of CPSS with reference to its application in this study. Firstly, the resolution dimension which is concerned measuring the aspect of creativity and whether or not the creativity of the product is valuable, logical and useful. This study is primarily interested in the aesthetic of the art and the originality of the form or shape, but will not extend to examining how the absence of adult involvement and influence has an effect on the design's functionality or fulfilment of a design brief. Secondly, because the study is concerned with signs of influence in the drawings CPSS does not include a dimension that considers this.

#### **4.4.5 Adopted Technique**

Based on the above review of the tools for assessing creativity, in light of the advantages and disadvantages and the aims of the study it was decided to adopt CPSS in this study. Due to the adoption of this tool, the drawings will be assessed by non-experts, who will be art teachers, however, not those teachers who are involved in the classroom experiments, questionnaires and interviews, using an adaptation of this widely adopted assessment method. There were a total of three teachers who judged the work individually. The teachers were chosen from three schools in different Parts in the city of Mecca region, that had not been involved in any previous experiments or contact during this study.



However, due to the aforementioned limitations of CPSS related to the resolution dimension and the fact that it does not consider signs of influence, a revised version of CPSS is offered by this study to overcome these limitations.

Because this study is only interested in the aspects of art relating to aesthetic originality, novelty and style and not resolution in terms of its value, logic and usefulness, and if it is understandable and well-crafted, and it retains the dimensions concerned with aesthetics, novelty and style and rejects resolution. Therefore, as a contribution of the study, the scales and subscales used in Besemer and O'Quin's CPSS will be adapted for the experiment in this study through excluding the resolution dimension and the associated sub scales of Understandable and Well-crafted. Furthermore, in reference to the limitation of assessing for signs of influence in the work by children, the study introduces a new dimension, namely; uninfluenced, which is concerned with the measure of signs of influence, described in section 4.4.3.

The use of CPSS will allow elaboration in the judgements of creativity. The study will provide rich data about the different aspects of creativity and how they are affected by the influences, as well as changes to these aspects in each of the experiments. This will be achieved by analysing the results from the different dimensions, subscales and adjective pairs of CPSS.

#### **4.4.6 Uninfluenced Dimension**

In addition to these subscales and adjective items adopted for this study used to assess creativity, i.e. those under Style and Novelty, it is also the intention of this study to identify signs of adult influence. Therefore, the CPSS will be adapted to suit this study with the introduction of a new dimension, 'Uninfluenced', to which a set of adjectives pairs are added, the subscale for this dimension will be 'Pure'. Adjective pairs are as follows:

Pure - Influenced, Natural - Unnatural, Free - Restricted, Unbiased - Biased, Undirected - Directed, Candid - Tactful, Natural - Affected.

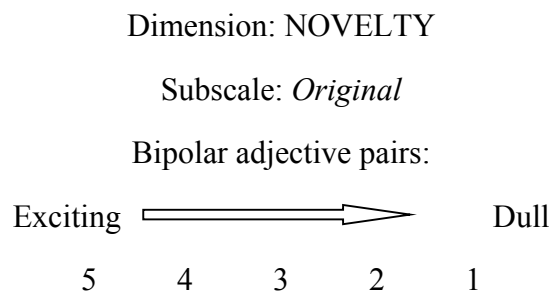
The justification for the inclusion of the 'Uninfluenced ' dimension is based on two factors, firstly that if teachers do influence work there will be signs of it in the work, and secondly there is value in work that exhibits signs of purity. Purity or 'pure' is one of sub scales of the uninfluenced dimension. In reference to the first factor, a hypotheses of the study (H1) says that teacher involvement has an influence of creativity, therefore it is important to look for signs of such influence while at the same time looking for signs where the work is not influenced through showing signs of purity.

These ideas are further supported by the literature, where it is believed that whatever a child produces is a pure representation of the child’s imagination and that such ability of children is tainted by pedagogical approaches to teaching art (Cizek 1936, Viola, 1942, Dubuffet 2003).

Franz Cizek’s approach to teaching art to children was minimal and was unlike the other skill-based programs, his aim was to foster self-expression in his pupils. He created a child friendly environment where formal instruction was non-existent the aim was to nurture creative tendencies that he believed was inherent in all children, allowing free exploration. Jean Dubuffet who coined the phrase art brut (raw art) or outsider art also expressed the idea of pure art. This is art that is produced by non-professionals including children, this was art that was free of intellectual norms.

The dimensions Style and Novelty will be adopted using the same adjective pairs in addition to the new dimension – Pure and the associated new adjective pairs (Figure 4-1). For each adjective pair a Likert scale will be applied between 5 and 1 as shown in the following example:

Figure 4-1 Dimensions, Subscales and Adjectives of Adapted CPSS



The following tables are the score sheets for this approach Table 4-2:

Table 4-2 CPSS Instrument

Dimension	Subscale	5	4	3	2	1
Style (Elaboration and Synthesis)	<i>Organic</i>					
	Orderly – disorderly					
	Arranged – disarranged					
	Organized – disorganized					

	Formed – formless					
	Complete – incomplete					
	Whole – partial					
	Sufficient – insufficient					
	Perfect – imperfect					
	<i>Elegant</i>					
	Harmonious – jarring					
	Graceful – awkward					
	Charming – repelling					
	Elegant - coarse					
	Attractive – unattractive					
	<i>Complex</i>					
	Intricate – simple					
	Complex – simple					
	Ornate – Plain					
	Complicated – straightforward					
	Interesting – boring					
<b>Novelty</b>	<i>Original</i>					
	Exciting – dull					
	Zippy - bland					
	Fresh – overused					
	Eccentric – conventional					

	New – old					
	Novel – predictable					
	Unusual – usual					
	Unique – ordinary					
	Original – commonplace					
	<b><i>Surprising</i></b>					
	Startling – stale					
	Surprising – customary					
	Astonishing – commonplace					
	Astounding - common					
	Shocking – ordinary					
	Unexpected - Expected					
	<b><i>Germinal</i></b>					
	Trendsetting – warmed over					
	Revolutionary – average					
	Radical – old hat					
<b>Uninfluenced</b>	<b>Pure</b>					
	Pure - Influenced					
	Natural - Unnatural					
	Free - Restricted					
	Unbiased - Biased					
	Undirected - Directed					

	Candid - Tactful					
	Natural - Affected					

The mean of all the adjective pairs under the subscale, is calculated in order to give the score for that particular subscale.

In order to ensure more reliability in the results, the assessment using CPSS will involve three judges giving their scores for each subscale. Inter-judge reliability will be measured by checking their level of agreement with each other.

#### 4.4.7 Reliability and Validity

An empirical study was carried out by Besemer and O'Quin (1986) to check the reliability of the 11 subscales of CPSS using T-shirts. In pursuit of validity a pilot study was carried out which aimed to determine if the CPSS could detect differences in Novelty of three products that were pre-determined to differ in terms of Novelty, to check generalisability of CPSS by using it with different products and finally, to refine the subscales (Besemer and O'Quin, 1986). Iterative reliability analyses were carried out on the 11 subscales resulting in 'good' and some 'excellent' scores for reliability, with the exception of the subscale 'Germinal' which scored 'poor' for reliability (Besemer and O'Quin, 1986).

Because the three dimensions are theoretically independent a factor analysis was carried out to look at the relationships between the subscales for each product separately, and for comparison among the products a multivariate repeated measures analysis of variance was carried out using the scores from the 11 subscales as dependent variables for the three products (Besemer and O'Quin, 1986).

The results of the reliability and validity study found that CPSS could clearly distinguish between products for the Novelty dimension and that for all three of the subscales in this dimension the products were significantly differentiated (Besemer and O'Quin, 1986).

In order to ensure that the results of the reliability and validity study were not affected by the judges bias a second study was carried out using uninvolved experts, moreover, in the second study they changed the products because it was felt that the products in the first study were too unusual and they wanted to test the generalisability of CPSS (Besemer and O'Quin, 1986). The results of this study showed that the judges did not differ in judgement and were able to perceive the differences in Elaboration and Synthesis and Novelty

but not in Resolution, however, it is important to note that for the present study Resolution has been completely removed and replaced with a new dimension ‘Uninfluenced’.

#### **4.4.8 Reliability and Validity for ‘Uninfluenced’ dimension**

As discussed in the above O’Quin and Besemer (1989) checked the reliability and validity of the updated CPSS. They checked if the instrument would be able to detect the differences in Novelty for three products that varied in their unusualness. For the present study the third dimension from Besemer and O’Quin’s CPSS ‘resolution’ was removed and replaced with ‘Uninfluenced’ for the purposes of the study. Thus, it is important that the ‘Uninfluenced’ dimension is assessed for reliability and validity to see if it can detect differences in the levels of the product being influenced. This was achieved using the same methods as Besemer and O’Quin (1989). Specifically, this was achieved using Factor Analysis, Kaiser-Meyer-Olkin (KMO) and Bartlett's Test, Correlation Matrix, Variance Explained and Component Matrix and analysis of Fractional Factorial Design and Cronbach's Alpha coefficient.

### **4.5 Conclusion**

This chapter presented the design and development of the experiments based on the identified potential influences, which include instruction, engagement and evaluation established in chapter three. How the findings of the primary and secondary research in terms of types of involvement, class structure, classroom layout and duration was shown to be incorporated in the experiment design as experiment variables. Specifically, the chapter first established the variables identified in the research, each variable was described in detail including how they were included in the experiment design. The development of the experiment also included the experiment structure and the experiment procedure, which included piloting and briefing of teachers in addition to the actual experiments.

This chapter presented CPSS to judge the creativity of drawings produced in the experiments. How this creativity evaluation techniques was applied to evaluate drawings produced in the experiment and a justification for its use was presented. Although it is difficult to judge what is a truly imaginative and creative art because this judgement is subjective, this was a suitable method to assess the effect of the various influences on creativity.

# 5 FINDINGS, ANALYSIS AND STATISTICAL EVALUATION USING (SPSS) CHAPTER FIVE

## CONTENTS

5.1	INTRODUCTION .....	108
5.2	ANALYSIS OF “ELABORATION & SYNTHESIS”, “NOVELTY” AND “UNINFLUENCED” DIMENSIONS .....	109
5.3	ANALYSIS OF INDIVIDUAL VARIABLES (EXPERIMENTS 2, 6 AND 7).....	116
5.4	ANALYSIS OF COMBINATION VARIABLES (EXPERIMENTS 3, 4 AND 5).....	119
5.5	ANALYSIS OF CONTROL EXPERIMENTS.....	121
5.6	ANALYSIS OF CONTROL EXPERIMENT (ALL VARIABLES) AND EXPERIMENT OF NO VARIABLES.....	123
5.7	ANALYSIS EXPERIMENTS OF INDIVIDUAL VARIABLES AND EXPERIMENT OF NO VARIABLES .....	124
5.8	ANALYSIS EXPERIMENTS OF COMBINATION VARIABLES AND EXPERIMENT OF NO VARIABLES .....	125
5.9	ANALYSIS OF ELABORATION & SYNTHESIS DIMENSION.....	127
5.10	ANALYSIS OF NOVELTY DIMENSION .....	137
5.11	ANALYSIS OF UNINFLUENCED DIMENSION .....	145
5.12	ANALYSIS OF CONTROL GROUP AND NON VARIABLES.....	152
5.13	DISCUSSION .....	157
5.14	CONCLUSION.....	159

## TABLES

TABLE 5-1 CRONBACH'S ALPHA .....	110
TABLE 5-2 KAISER-MEYER-OLKIN (KMO) AND BARTLETT'S TEST .....	110
TABLE 5-3 MULTIPLE RESPONSE REGRESSION RESULTS, ALL SUB-DIMENSIONS.....	111
TABLE 5-4 ANOVA .....	112
TABLE 5-5 CRONBACH'S ALPHA .....	127
TABLE 5-6 ITEM-TOTAL STATISTICS .....	127
TABLE 5-7 CRONBACH'S ALPHA .....	128
TABLE 5-8 ITEM-TOTAL STATISTICS .....	128
TABLE 5-9 KAISER-MEYER-OLKIN (KMO) AND BARTLETT'S TEST .....	129
TABLE 5-10 TOTAL VARIANCE EXPLAINED .....	129
TABLE 5-11 COMPONENT MATRIX .....	131
TABLE 5-12 MULTIPLE RESPONSE REGRESSION.....	132
TABLE 5-13 ANOVA .....	133
TABLE 5-14 CRONBACH'S ALPHA .....	137
TABLE 5-15 ITEM-TOTAL STATISTICS .....	137
TABLE 5-16 KAISER-MEYER-OLKIN (KMO) AND BARTLETT'S TEST .....	138
TABLE 5-17 TOTAL VARIANCE EXPLAINED .....	138

TABLE 5-18 COMPONENT MATRIX .....	140
TABLE 5-19 MULTIPLE RESPONSE REGRESSION.....	141
TABLE 5-20 ANOVA .....	142
TABLE 5-21 CRONBACH'S ALPHA .....	145
TABLE 5-22 ITEM-TOTAL STATISTICS .....	145
TABLE 5-23 KAISER-MEYER-OLKIN (KMO) AND BARTLETT'S TEST .....	146
TABLE 5-24 TOTAL VARIANCE EXPLAINED .....	146
TABLE 5-25 COMPONENT MATRIX .....	147
TABLE 5-26 MULTIPLE RESPONSE REGRESSION.....	148
TABLE 5-27 ANOVA .....	149
TABLE 5-28 CRONBACH'S ALPHA .....	152
TABLE 5-29 KAISER-MEYER-OLKIN (KMO) AND BARTLETT'S TEST .....	152
TABLE 5-30 TOTAL VARIANCE EXPLAINED .....	153
TABLE 5-31 COMPONENT MATRIX .....	155
TABLE 5-32 MULTIPLE RESPONSE REGRESSION FOR ALL DIMENSIONS .....	158

## FIGURE

FIGURE 5-1 OVERALL EFFECT OF CREATIVITY .....	109
FIGURE 5-2 LEAST SIGNIFICANT DIFFERENCES TEST .....	113
FIGURE 5-3 MULTIPLE PLOT OF STATAPUT DATE .....	115
FIGURE 5-4 INDIVIDUAL VARIABLES .....	117
FIGURE 5-5 COMBINATION VARIABLES.....	120
FIGURE 5-6 CONTROL GROUP EXPERIMENTS .....	123
FIGURE 5-7 CONTROL EXPERIMENT (ALL VARIABLES) AND EXPERIMENT OF NO VARIABLES.....	124
FIGURE 5-8 INDIVIDUAL VARIABLES AND EXPERIMENT OF NO VARIABLES .....	125
FIGURE 5-9 COMBINATION VARIABLES AND EXPERIMENT OF NO VARIABLES .....	126
FIGURE 5-10 PARETO DIAGRAM FOR PRINCIPAL COMPONENT.....	130
FIGURE 5-11 THE ITEMS ON THE PLANE OF THE FIRST TWO PRINCIPAL COMPONENTS.....	132
FIGURE 5-12 LEAST SIGNIFICANT DIFFERENCES TEST .....	134
FIGURE 5-13 MULTIPLE PLOT OF STATAPUT DATE .....	136
FIGURE 5-14 PARETO DIAGRAM FOR PRINCIPAL COMPONENT.....	139
FIGURE 5-15 LEAST SIGNIFICANT DIFFERENCES TEST .....	143
FIGURE 5-16 MULTIPLE PLOT OF STATAPUT DATE .....	144
FIGURE 5-17 PARETO DIAGRAM FOR PRINCIPAL COMPONENT.....	147
FIGURE 5-18 MULTIPLE PLOT OF STATAPUT DATE .....	150
FIGURE 5-19 LEAST SIGNIFICANT DIFFERENCES TEST .....	151
FIGURE 5-20 PARETO DIAGRAM FOR PRINCIPAL COMPONENT.....	154
FIGURE 5-21 THE ITEMS ON THE PLANE OF THE FIRST THREE PRINCIPAL COMPONENTS.....	156



## 5.1 Introduction

This chapter presents the findings and analysis of the effect of involvement variables on the creativity scores from the experiments which were measured using the adapted Creative Product Semantic Scale (CPSS). CPSS includes the addition of an adopted creativity dimension, namely, Uninfluenced, which measures sign of influence in the designs. The effect on the three creativity dimensions of “Elaboration and Synthesis”, “Novelty” and “Uninfluenced” of involvement of all possible variations of variables (instruction, engagement and evaluation) were tested (the trial) in a total of nine experiments. The overall results for all experiments are presented in this chapter. The dimensions of CPSS, namely “Elaboration and Synthesis”, “Novelty” and “Uninfluenced” are used to measure the effect on creativity by these variables. This chapter presents the results for the different experimental situations, where the variables were tested together, in combination, individually as well as the creativity tests where no variables were present.

Moreover, the results of statistical significance, validity and reliability are presented for the creativity outcomes for all three mentioned dimensions. Specifically, the data from the independent evaluation (judgment) of design outcomes was obtained from independent evaluators for a total of 162 designs from all experiments. Analysis has been conducted based on the methodology described by Besemer and O’Quin 1986, O’Quin, Besemer 1989, Besemer 1998 and Besemer and O’Quin 1999. In Besemer’s standard CPSS model, it has proposed that two conceptual dimensions be considered in analysis of creativity in products: “Elaboration & Synthesis” and “Novelty” dimensions. In the present study, a third dimension was proposed, to evaluate the level of influence on creativity of children, and was termed the “Uninfluenced” dimension. This dimension was analysed according to Besemer’s methodology as with the other two dimensions. Within the three dimensions, there were a total of 8 subscales or criteria used for assessing creativity as follows: Organic, Elegant, Complex and Understandable (Elaboration & Synthesis); Original, Surprising and Germinal (Novelty) and Pure (Uninfluenced).

In order to conduct this statistical analysis, the Statistical Package for Social Sciences (SPSS) was used. The conventional statistical techniques have been employed to analyse the collected in the trial, these methods which included Kaiser-Meyer-Olkin (KMO) and Bartlett's Test, Correlation Matrix, Factor Analysis, Variance Explained and Component Matrix and regression analysis of Fractional Factorial Design used in this study. The Cronbach's Alpha coefficient was used to test the reliability method at the start of the analysis.

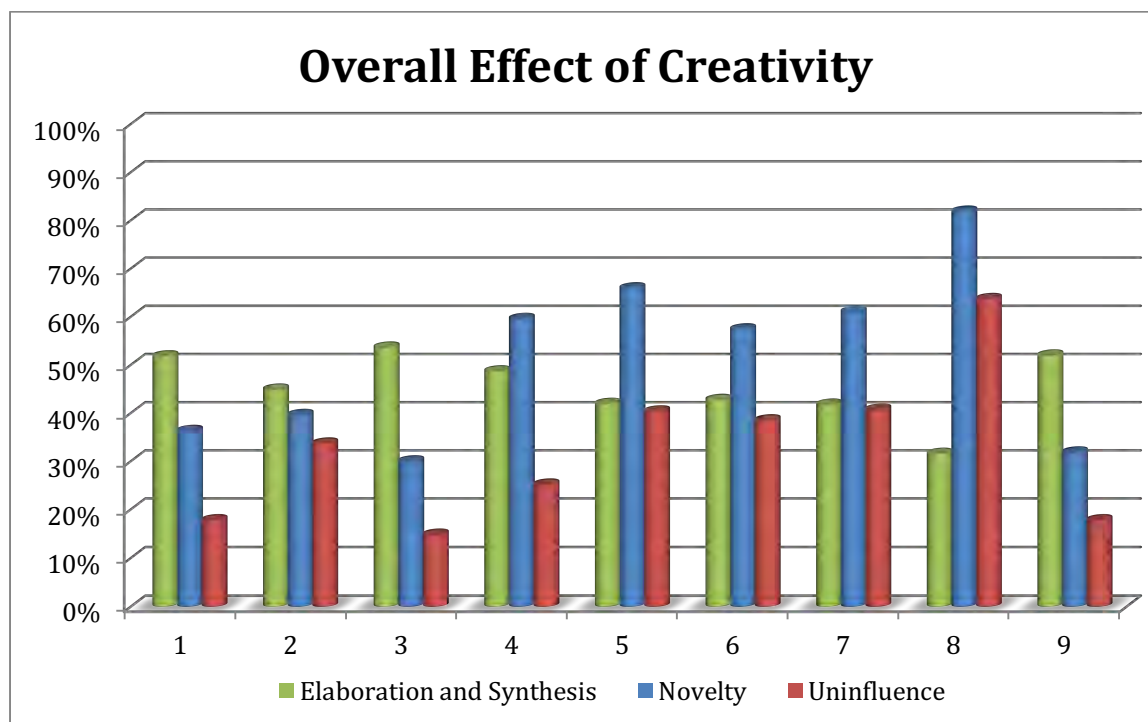
## 5.2 Analysis of “Elaboration & Synthesis”, “Novelty” and “Uninfluenced” Dimensions

In total, there were nine experiments, where each of the three creativity dimensions of Elaboration and Synthesis, Novelty and Uninfluenced have been studied. The overall results for all experiments are presented in Figure 5-1. The overall effect on creativity of the variables (instruction, engagement and evaluation) is measured according to the aforementioned dimensions of CPSS. Here the overall results are shown for the different combinations where the variables were tested together, in combination, individually as well as in creativity tests where no variables were present.

The subscales of Elaboration & Synthesis dimension are comprised of the following items Organic, Elegant, and Complex. The subscales of Novelty dimension are comprised of the following items Original, Surprising and Germinal. The subscale of Uninfluenced dimension is comprised of the following items Pure.

Overall, the findings show that in each experiment, where different variables were tested, there was variation in the results for the dimensions, Elaboration and Synthesis, Novelty and Uninfluenced, which showed differing effects on overall creativity between the experiments.

Figure 5-1 Overall Effect of Creativity



Source: Researcher’s survey

### 5.2.1 Reliability Statistics (Cronbach's Alpha)

Following CPSS Besemer, summated scales were used for the subscales of the all dimensions in order to measure between the two opposing ideas of the bipolar adjective pairs; Cronbach's Alpha, a mathematical method to calculate reliability, is used for assessing the reliability of the scales. The first step of the reliability analysis is indicated in Table 5-1. At the calculation, the Cronbach's Alpha was 0.774.

Table 5-1 Cronbach's Alpha

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.774	.747	43

### 5.2.2 Factor Analysis

Factor analysis can be used (Besemer and O'Quin 1999) to establish that sets of observed variables (adjective pairs or items) are all measuring the same underlying common factor. The tests for the adequatness of the sample size and sphericity of need to be done prior to Factor Analysis, they indicate a Kaiser-Meyer-Olkin (KMO) measure of 0.952, Table 5-2 characterising adequacy of the sample size. Bartlett's test of sphericity shows that significance for sphericity is good,  $p < 0.001$ . The KMO and Bartlett's test is a measure of the adequacy of the sample size, to show that the sample size is statistically adequate.

#### 5.2.2.1 Kaiser-Meyer-Olkin (KMO) and Bartlett's Test

Table 5-2 Kaiser-Meyer-Olkin (KMO) and Bartlett's Test

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.952
Approx. Chi-Square		22483.576
Bartlett's Test of Sphericity	df	903
	Sig.	.000

The Factor Analysis results illustrate the fact that all items loading the factors in a very complicated way. However, the factor analysis on total 3 groups as a one dataset cannot provide the picture of changes in individual dimensions and needs to be done in chosen sub-dimensions.

### 5.2.3 Analysis of Fractional Factorial Design

As it is well known in statistical analysis, a factorial experiment is an experiment that comprises of two or more control factors, where each of these factors has their own discrete possible values or "levels", and where the experimental units can have all possible or needed combinations of these levels across all of the factors.

The factorial design selection method allows to create a full or fractional factorial design using from 4 to 128 runs and from 3 to 11 factors. In total there were 162 possible combinations from running (full factorial) 8 experiments including 3 factors (instruction, engagement and evaluation) in various combinations for a total of 18 participants to reveal statistical significance.

#### 5.2.3.1 Multiple Response Regression

Multiple response regression analysis is a statistical analytical method used to estimate the influence of chosen factors/variables on a dependent/output variable in a factorial experimental design, which was conducted in this trial. Regression analysis can include numerous techniques for modelling and analysing different variables when the relationship between a dependent variable and independent variables is the focus. Regression analysis helps in understanding how the typical value of a dependent variable changes when an independent variable is changing, while at the same time the other independent variables are kept fixed. The conventional P value shows statistical significance of calculated coefficients as a result of all the experiments. In this trial, the resulting for  $R^2$  was found at 0.8361, which indicates good overall statistical significance for the total model containing all 3 novelty dimensions, Table 5-3. All individual coefficient values in table 5-3 are also statistically significant indicating the P value, which is less than 0.05, Table 12, column P (2 Tail).

*Table 5-3 Multiple Response Regression results, all sub-dimensions*

Y-hat Model		CREATIVITY			
Factor	Name	Coefficient	P(2 Tail)	Tolerance	Active
Constant		323.28	0.0000		
A	Instruction	-32.215	0.0000	1	X
B	Engagement	-16.674	0.0000	1	X

C	Evaluation	5.049	0.0018	1	X
AB		-4.424	0.0060	1	X
AC		12.549	0.0000	1	X
BC		4.451	0.0057	1	X
ABC		-14.410	0.0000	1	X
<b>R<sup>2</sup></b>		<b>0.8361</b>			
<b>Adj R<sup>2</sup></b>		0.8277			
<b>Std Error</b>		19.0325			
<b>F</b>		99.1446			
<b>Sig F</b>		0.0000			
<b>F<sub>LOF</sub></b>		NA			
<b>Sig F<sub>LOF</sub></b>		NA			
<b>Source</b>		<b>SS</b>	<b>df</b>	<b>MS</b>	
<b>Regression</b>		251397.0	7	35913.9	
<b>Error</b>		49264.3	136	362.2	
<b>Error<sub>Pure</sub></b>		49264.3	136	362.2	
<b>Error<sub>LOF</sub></b>		0.0	0	NA	
<b>Total</b>		300661.3	143		

### 5.2.3.2 Analysis of Variance (ANOVA)

ANOVA is a method of analysis of variance is used to determine if there is a statistically significant difference between the means of three or more independent groups. Using ANOVA the P values also indicated statistical significance Table 5-4.

Table 5-4 ANOVA

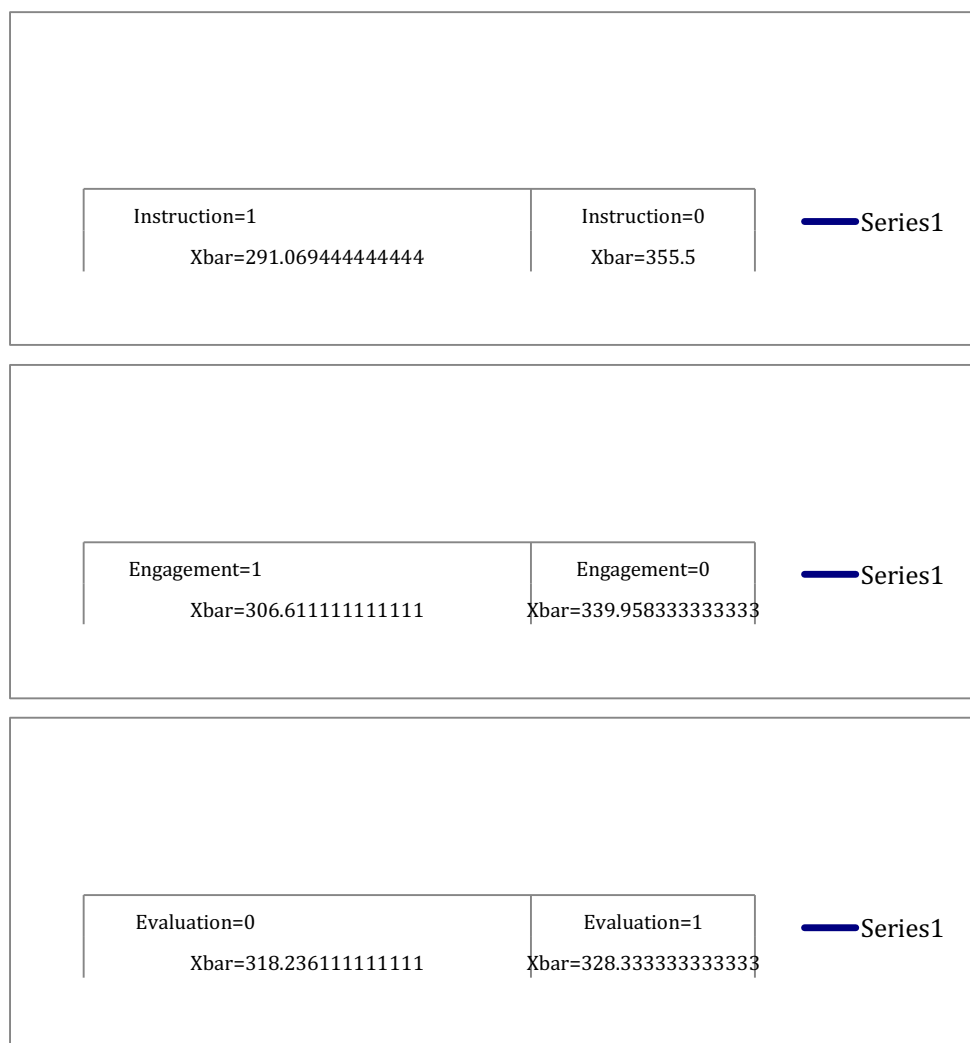
<b>Creativity</b>						
<b>Source</b>	<b>Source</b>	<b>Source</b>	<b>Source</b>	<b>Source</b>	<b>Source</b>	<b>Source</b>
Instruction	149446.7	1	149446.7	412.566	0.000	49.71%
Engagement	40033.3	1	40033.3	110.517	0.000	13.32%
Evaluation	3670.3	1	3670.3	10.132	0.002	1.22%
AB	2817.8	1	2817.8	7.779	0.006	0.94%
AC	22675.3	1	22675.3	62.598	0.000	7.54%
BC	2853.3	1	2853.3	7.877	0.006	0.95%
ABC	29900.2	1	29900.2	82.543	0.000	9.94%
Error	49264.278	136	362.237			16.39%
Total	300661.326	143				

One can see also that the control factors also interact (Table 5-3, Table 5-4), and this interaction is statistically significant. This also indicates that the total sample, when all three dimensions are mixed, indicate the mutually opposite influence and proves that the separately all these 3 sub-dimensions (“Elaboration and Synthesis”, “Novelty” and “Uninfluenced”) should be analysed.

### 5.2.3.3 Least-Significant Difference Test

The least significant differences plot is produced to determine if levels within a factor significantly different. The presence of a line indicates no significance between variables, whereas the absence of a line indicates statistical significance. In the graphic below (Figure 5-2) there is no blue line for each of the three experiment variables; this means that there is a statistical difference between these three variables. This indicates that there is a statistically significant difference in creativity of creativity between the experiments.

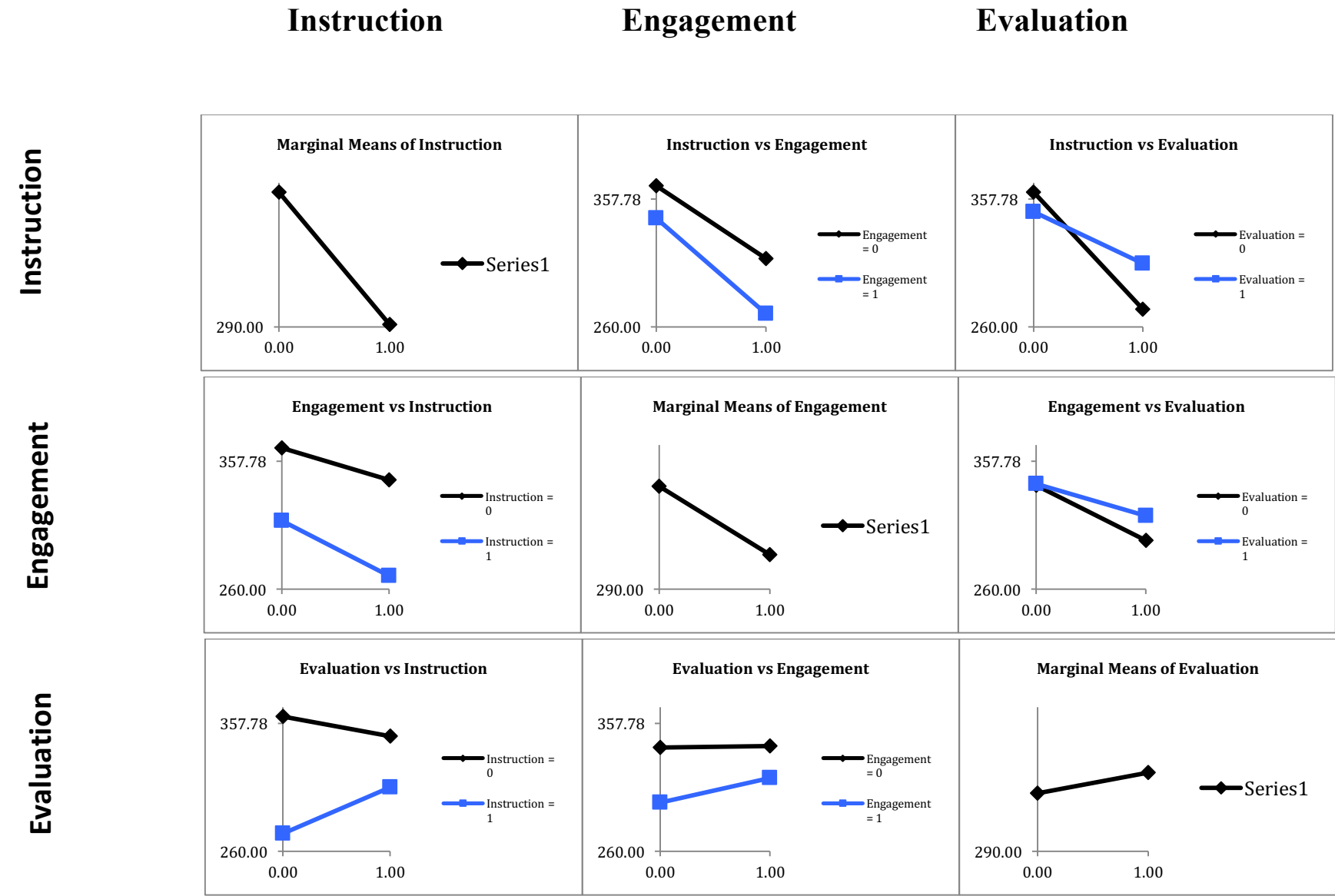
Figure 5-2 Least Significant Differences Test



#### **5.2.3.4 Multiple Plot of Statapult Data**

The multiple plot is confirming results discussed before graphically, illustrating details on one screen all the marginal means plot and all the interaction combinations Figure 5-3. The analysis here shows that there is an interaction between instruction and evaluation, which supports that they have a strong effect on each other. There is a weaker effect is found between engagement and evaluation.

Figure 5-3 Multiple Plot of Stataput Date





## **5.3 Analysis of Individual variables (Experiments 2, 6 and 7)**

### **5.3.1 Instruction (Experiment 2)**

The overall score of Instruction variable (Experiment 2) for Elaboration and Synthesis was 45 percent and for Novelty it was 40 percent: this provided an overall score for creativity of 42 percent. The overall score for Influence was 34 percent. The effect that instruction had on creativity is reflected in drawing outcomes, see Experiment 2 in the appendices.

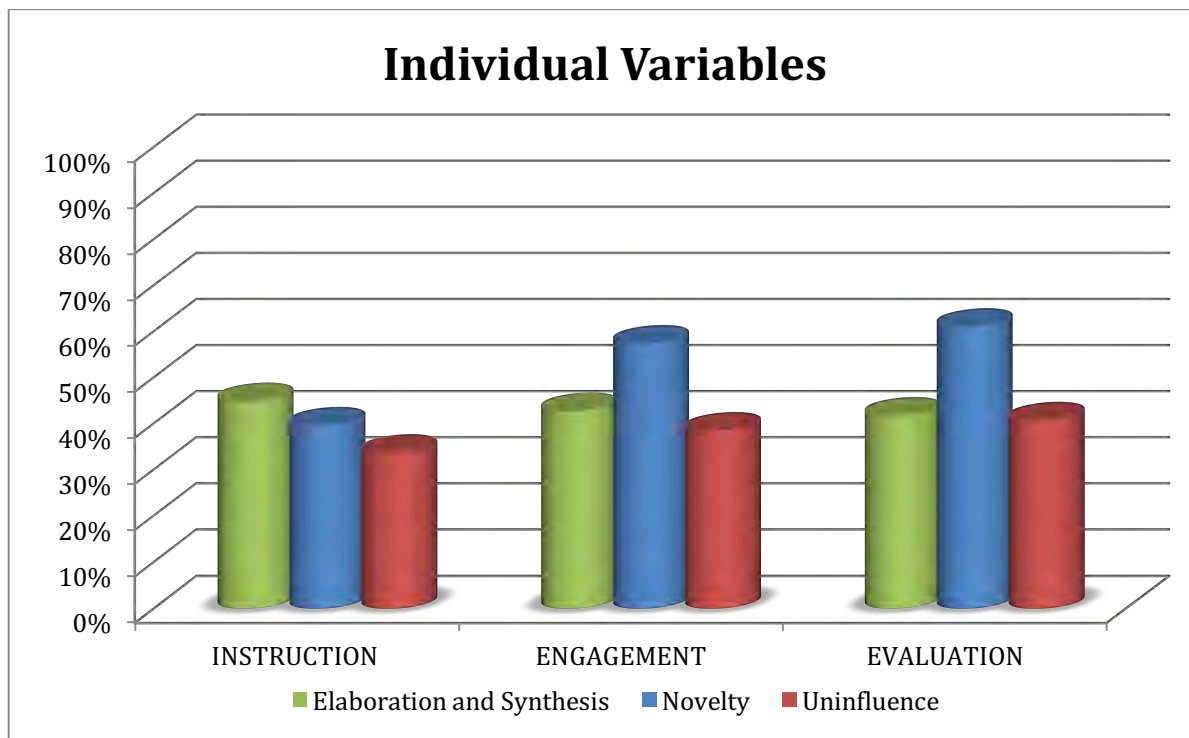
### **5.3.2 Engagement (Experiment 6)**

The overall score of Engagement variable (Experiment 6) for Elaboration and Synthesis was 43 percent and for Novelty it was 57 percent: this provided an overall score for creativity of 50 percent. The overall score for Influence was 38 percent. The effect that engagement had on creativity is reflected in drawing outcomes, see Experiment 6 in the appendices.

### **5.3.3 Evaluation (Experiment 7)**

The overall score of Evaluation variable (Experiment 7) for Elaboration and Synthesis was 42 percent and for Novelty it was 61 percent: this provided an overall score for creativity of 51 percent. The overall score for Influence was 41 percent. The effect that evaluation had on creativity is reflected in drawing outcomes, see Experiment 7 in the appendices.

Figure 5-4 Individual Variables



Source: Researcher's survey

### 5.3.4 Overall of Analysis of Individual variables

In reference to each of the individual variables in the experiments, namely: instruction, engagement and evaluation, it was found that instruction received the lowest score for creativity at 42 percent. This lower score for overall creativity was comprised of a score of 45 percent for Elaboration and Synthesis, 40 percent for Novelty and 34 percent for Uninfluenced. In terms of overall creativity, instruction was found to be the most negative influence on creativity. The reliability analysis has indicated overall for the three variables that at the calculation, the Cronbach's Alpha was 0.855, the factor analysis for all dimensions indicated a good KMO measure at 0.820, and the sample size was found to be adequate.

However, because the scores for the Elaboration and Synthesis were relatively similar for all of the variables (instruction 45 percent, engagement 43 percent and evaluation 42) it was not the Elaboration and Synthesis component of creativity that was shown to be affected by one variable more than the other. Where there was a lack of consistency in the results was in relation to the Novelty aspect of creativity. The Novelty aspect of creativity was shown to be significantly influenced by instruction in comparison to the other variables. For engagement, there was a Novelty score of 57 percent and for evaluation 61 percent in comparison to only 40 percent for instruction. Therefore, it can be concluded that instruction is a significant influence on creativity in terms of the novelty of the work produced by children.

The Uninfluenced dimension was introduced to show the level of adult or pedagogical influence that was evident in art produced by children. In reference to the idea that instruction had the most influencing effect on creativity, evidenced by a low score for Novelty, the instruction variable correspondingly had the lowest score for Uninfluenced at 34 percent in comparison to 39 percent for engagement and 41 percent for evaluation. Therefore, this shows that instruction has the greatest influence on art in comparison to the other variables on Uninfluenced. However, it is important to note that there was not a wide variation in the score, between 34 and 41 percent.

Both engagement and evaluation were shown to have a similar effect on overall creativity: this similar influence on creativity was found to be true for the individual aspects of creativity, Elaboration and Synthesis, Novelty and Uninfluenced which each received similar scores.

Engagement was shown to have less effect on overall creativity than instruction: this was again due to the Novelty dimension where engagement was shown to have a much lesser effect on this component of creativity than instruction. Moreover, the signs of influence were less than that of instruction, although this difference was marginal and there was no significant difference between engagement and the other two variables in terms of its effect on the Elaboration and Synthesis component of creativity.

The evaluation variable had very similar effects on Elaboration and Synthesis to the other two variables, where the variation in results was shown to be close. However, the score for Novelty was much higher than the other two variables at 61 percent in comparison to 57 percent for engagement 40 percent for instruction. This showed that evaluation had less of a negative impact on Novelty than the other variables. The score for Uninfluenced was shown to be marginally more for evaluation than the other two dimensions, which show that evaluating the work has less of an influence on the children's creative process.

In summarisation, for the effect of the individual variables, instruction had the most significant negative effect on creativity, evidenced by lower scores for creativity and a higher score for signs of influence, although it should be noted that this was marginal.

## **5.4 Analysis of Combination variables (Experiments 3, 4 and 5)**

### **5.4.1 Instruction & Engagement (Experiment 3)**

The overall score of Instruction & Engagement variables (Experiment 3) for Elaboration and Synthesis was 54 percent and for Novelty it was 30 percent, this providing an overall score for creativity of 42 percent. The overall score for Influence was 15 percent. The effect that instruction and engagement had on creativity is reflected in drawing outcomes, see Experiment 3 in the appendices.

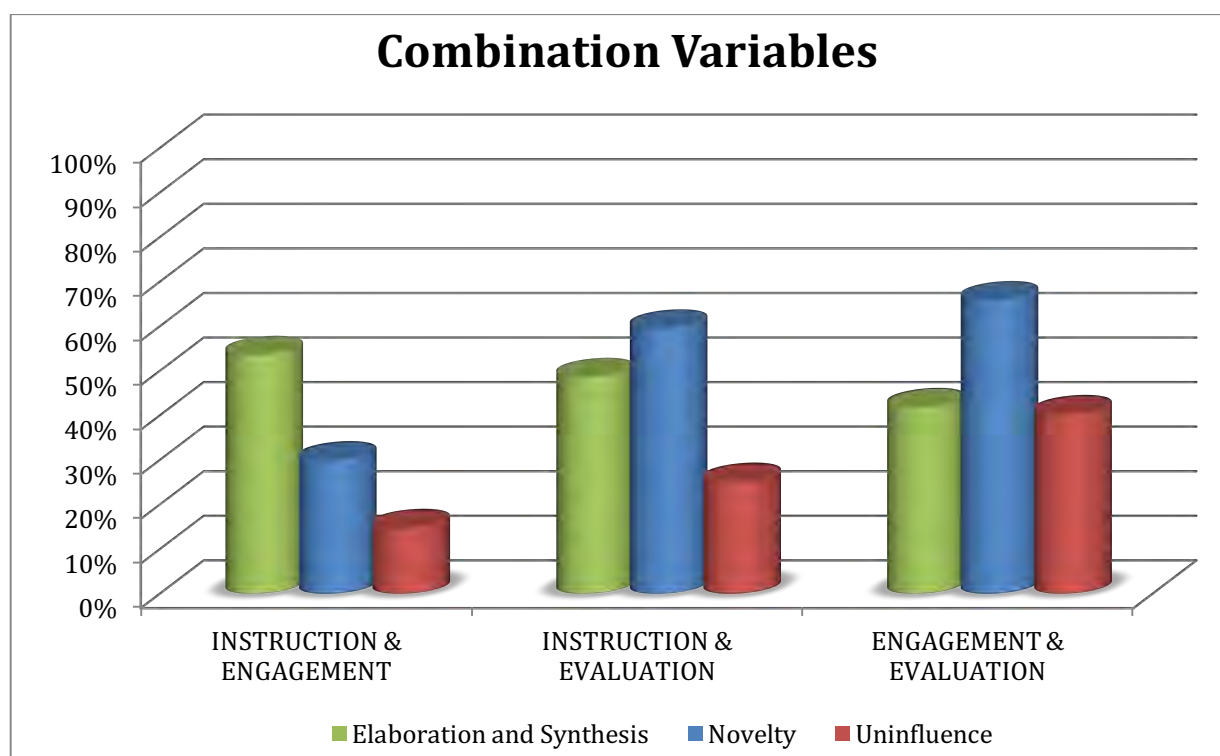
### **5.4.2 Instruction & Evaluation (Experiment 4)**

The overall score of Instruction & Evaluation variables (Experiment 4) for Elaboration and Synthesis was 49 percent and for Novelty it was 60 percent, this providing an overall score for creativity of 54 percent. The overall score for Influence was 25 percent. The effect that instruction and evaluation had on creativity is reflected in drawing outcomes, see Experiment 4 in the appendices.

### **5.4.3 Engagement & Evaluation (Experiment 5)**

The overall score of Engagement & Evaluation variables (Experiment 5) for Elaboration and Synthesis was 42 percent and for Novelty it was 66 percent, this providing an overall score for creativity of 54 percent. The overall score for Influence was 40 percent. The effect that engagement and evaluation had on creativity is reflected in drawing outcomes, see Experiment 5 in the appendices.

Figure 5-5 Combination Variables



Source: Researcher's survey

#### 5.4.4 Overall Analysis of Combination variables

In the previous section the results for the testing of each variable was presented individually. It was found that instruction was the most influencing variable on creativity. In this section, the results and analysis for the effect of two variables in various possible combinations are presented. This will provide greater insight into the effect of various types of involvement on the creativity in children's art. Moreover, in these scenarios there is always one variable that is absent, which will also provide further insight into its effect on creativity. This is particularly important in light of the findings about the effect of instruction. The reliability analysis for the overall results of the aforementioned variable combinations indicated at the calculation, the Cronbach's Alpha was 0.812, the factor analysis for the all dimension indicated a good KMO measure at 0.907, and the sample size was found to be adequate.

Where instruction and engagement are tested together, the score for overall creativity was 42 percent, which was lower than the other two combinations at 54 percent each. Therefore, the combination of instruction and engagement has a stronger negative effect on creativity that the other two combinations.

The lower overall creativity score for the instruction - engagement combination is due to the fact that the score for Novelty which comprises creativity was significantly low at 30 percent which was half compared

to the Novelty scores of 60 percent for instruction – evaluation and 66 percent for engagement - evaluation. Therefore, the Novelty aspect of creativity is most negatively affected by the combination of instruction and engagement variables. This was similar to the finding for the instruction variable tested alone. Furthermore, as with the experiment where instruction was tested alone, the instruction – engagement combination gave a higher score for Elaboration and Synthesis than the other two combinations.

This contrast between Elaboration and Synthesis and Novelty was also found in the experiments where variables were tested individually.

Where instruction was combined with evaluation there was a much higher overall score for creativity at 54 percent. This high score was due to the component score for Novelty at 60 percent. In comparison to the engagement – evaluation variable combination, there was not much difference compared to instruction and evaluation: this was the case for the overall creativity scores which stood at 54 percent for both combinations, 49 and 42 percent respectively for Elaboration and Synthesis and 60 and 66 percent respectively for Novelty.

The results for the Uninfluenced dimension varied considerably between the different variable combinations. The score was a very low 15 percent for the instruction – engagement combination; this was followed by 25 percent for instruction – evaluation combination and 40 percent for engagement – evaluation. In consideration of the results shown in the previous sections for the effect of individual variables it was shown that instruction had a more significant effect on the evidence of influence in the art. This is also the case where instruction is included in combination with other variables. Therefore, the results suggest that instruction has a significant effect on signs of creativity in the work.

However, the combinations not only indicate the effect of the presence of two variables but also the effect of the absence of one of the variables. In the engagement – evaluation combination where instruction is absent, the score for the Uninfluenced dimension was much higher than the combinations where instruction was included in combination. This supports the idea that instruction is an influencing factor on creativity and the signs of influence as a variable on its own and when it is in combination with other variables.

## **5.5 Analysis of Control Experiments**

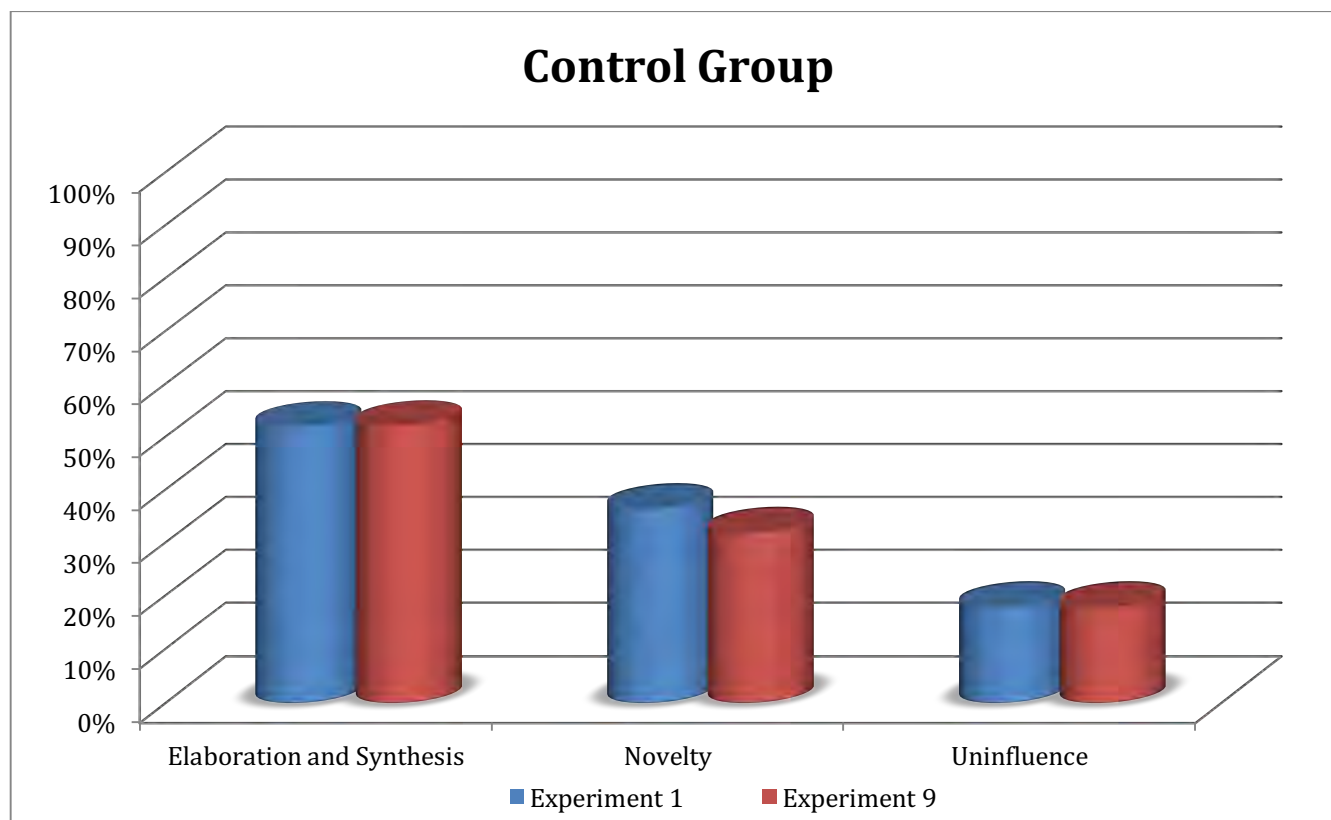
The control experiments were established in order to see if there were any changes that were affected by participating in the experiments. Control experiments were established before the experiments took place and after all the experiments were complete.

The results of the control experiments are compared in order to see if the normal experiments have an impact on creativity. Experiments 1 and 9 were the control groups. For each of the control experiments all three of

the variables, instruction, engagement and evaluation are included to represent a normal classroom situation where the teacher is fully engaged with the child. Reliability analysis was conducted overall for both control groups and indicated at the calculation, the Cronbach's Alpha was 0.738. The factor analysis for the all the dimensions indicated a good KMO measure at 0.878, and the sample size was adequate. The effect that all of the aspects of teacher involvement had on creativity is reflected in drawing outcomes, see Experiment 1 and 9 in the appendices.

Within the control experiments that included there are consistency for all three of the CPSS dimensions, which were Elaboration and Synthesis, Novelty and Uninfluenced. Elaboration and Synthesis gave overall scores of 52 percent and 52 percent for experiments 1 and 9 respectively. Novelty gained overall scores of 36 percent and 32 percent respectively for the same experiments and the Uninfluenced dimension gave overall scores of 18 percent for both experiments Figure 5-6.

Figure 5-6 Control Group Experiments



Source: Researcher's survey

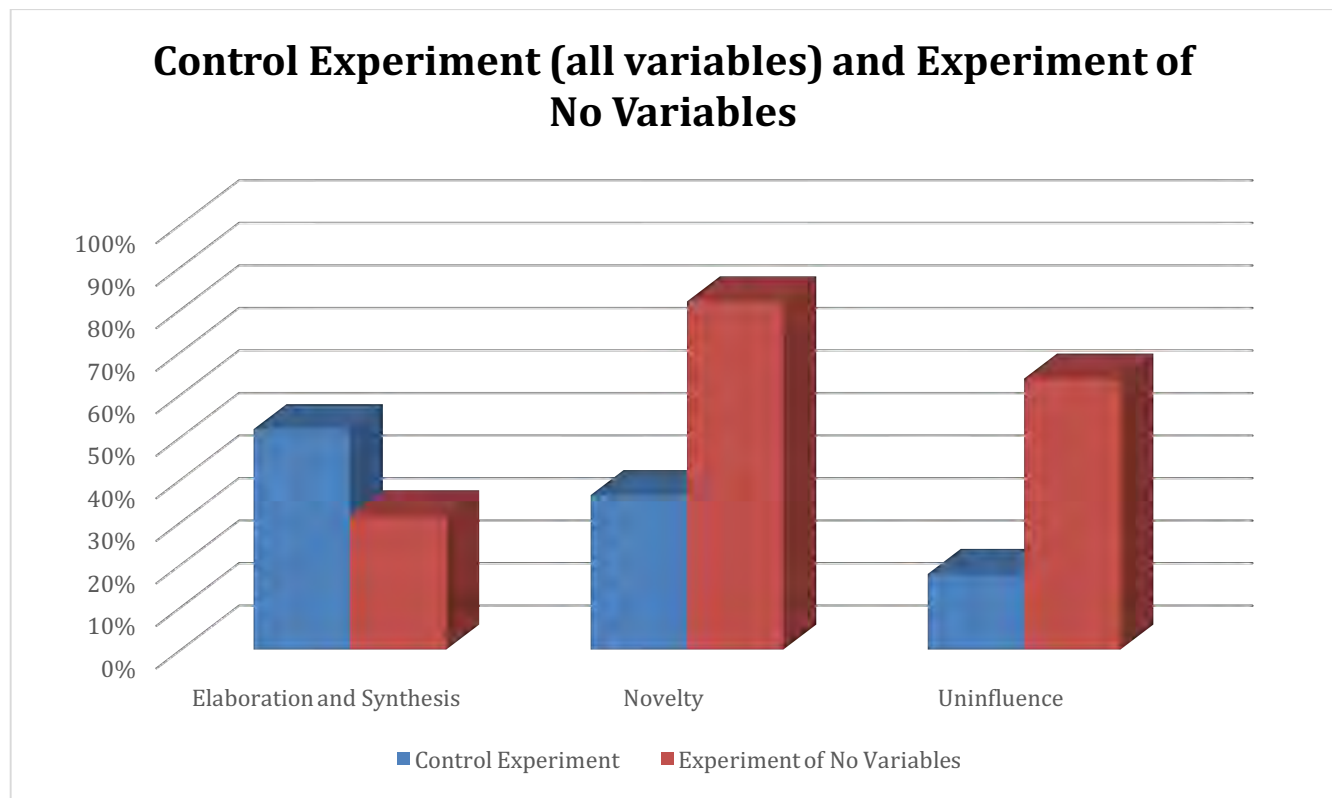
## 5.6 Analysis of Control Experiment (all variables) and Experiment of No Variables

There were two control experiments, experiment 1 with all variables included and experiment 8 with no variables. These control experiments had differing effects on the dimensions of creativity. In reference to Elaboration and Synthesis, these control experiments showed that where there were no influence variables it had the greatest negative impact on this dimension of creativity. This was in contrast to the impact of the presence of all three variables, which was significantly less (Figure 5-7).

However, the opposite was found to be true for the impact on the other two dimensions of creativity; Novelty and Uninfluenced, where the presence of all three variables had a considerable negative impact in comparison to the impact where there were no variables present (Figure 5-7).



Figure 5-7 Control Experiment (all variables) and Experiment of No Variables

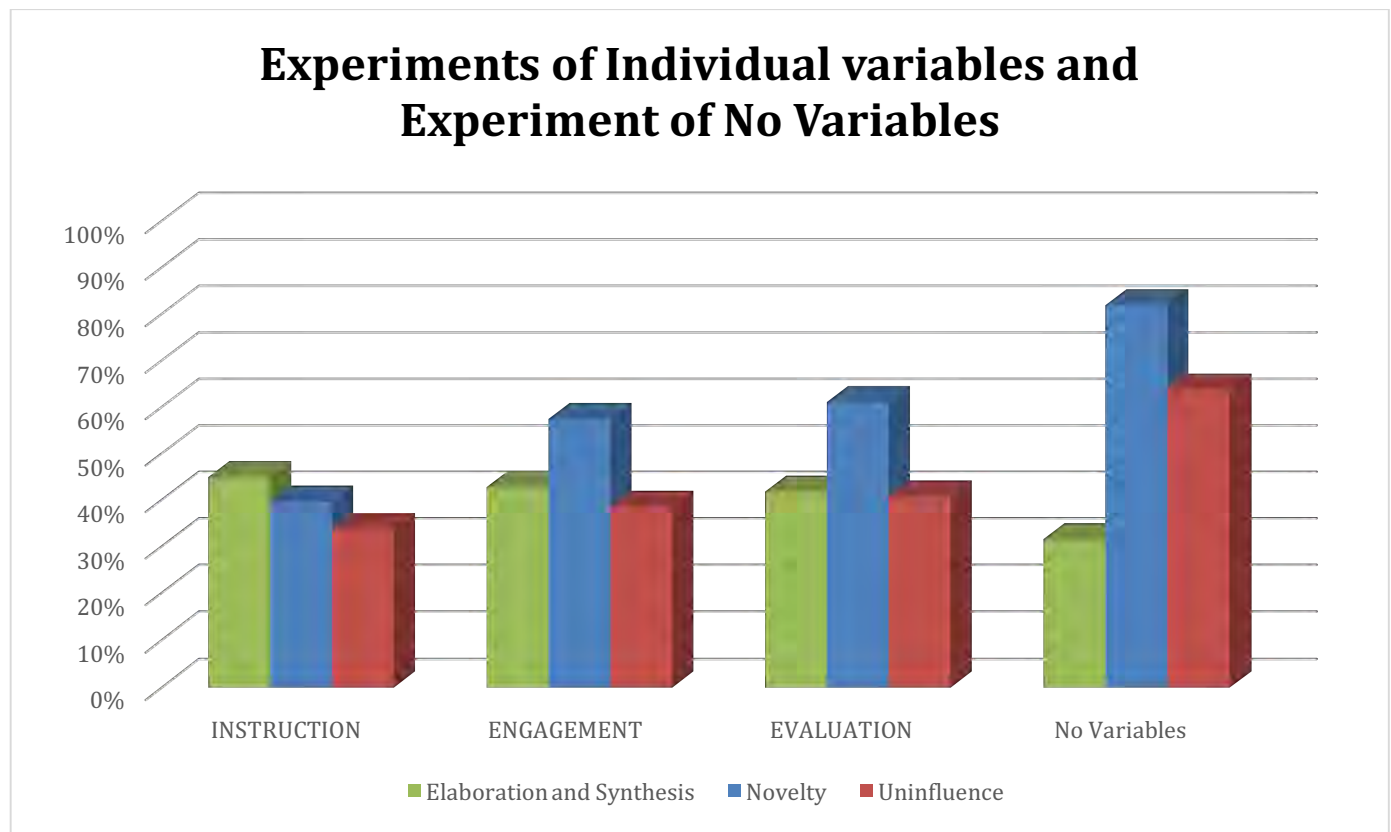


Source: Researcher's survey

## 5.7 Analysis Experiments of Individual variables and Experiment of No Variables

In reference to the effect of each individual variable on each dimension of creativity in comparison to the effect of no variables on the same dimensions of creativity, it was noted that there was a significant increase in the creativity scores for Novelty and Uninfluenced where no variables were included. However, there was a corresponding decrease in the score for Elaboration and Synthesis. This would suggest that the overall effect of teacher involvement has a negative effect on Novelty and Uninfluenced and a positive effect on Elaboration and Synthesis. Furthermore, from the results here it was clear that instruction had the greatest negative impact on Novelty and Uninfluenced in contrast to engagement and evaluation Figure 5-8.

Figure 5-8 Individual Variables and Experiment of No Variables

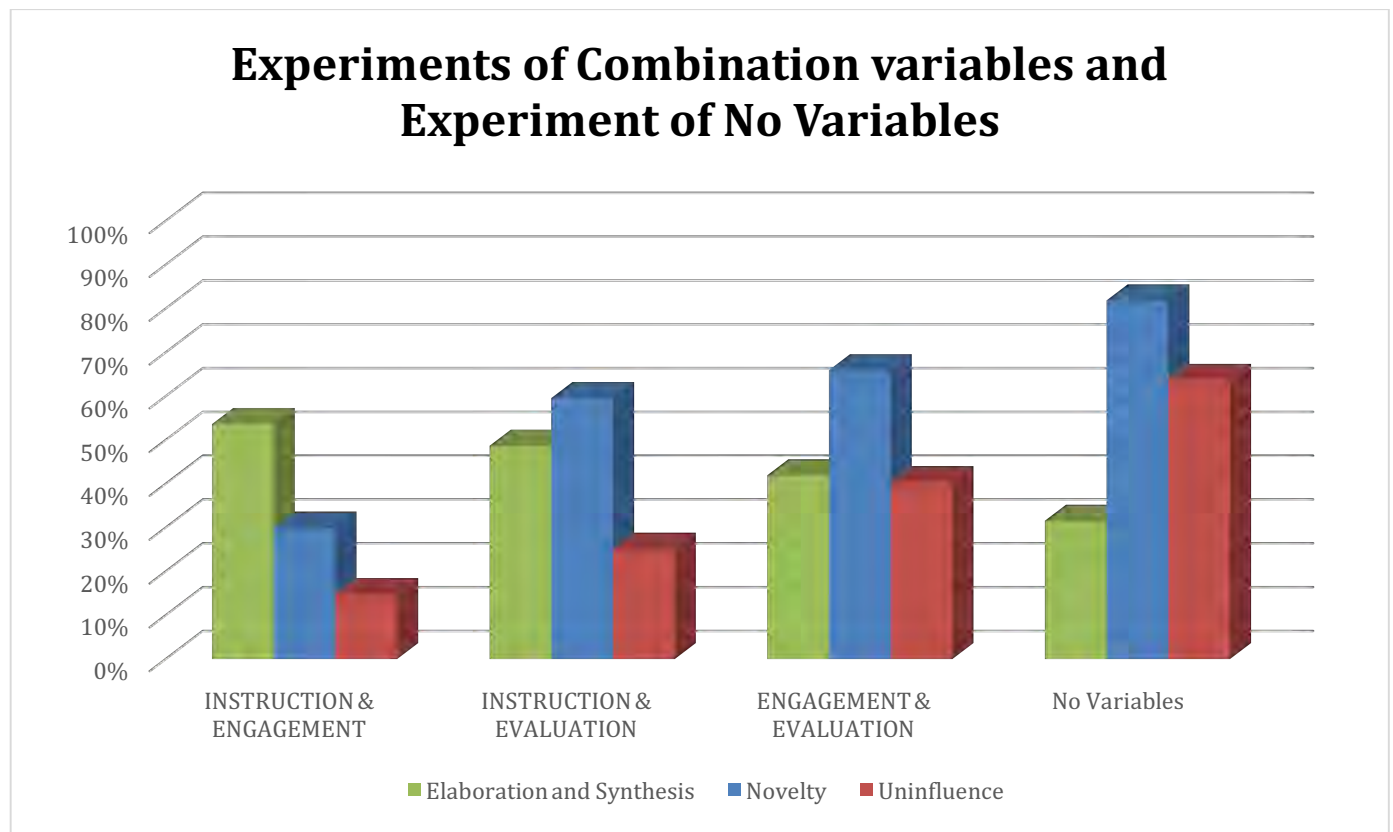


Source: Researcher's survey

## 5.8 Analysis Experiments of Combination variables and Experiment of No Variables

The first noticeable finding from these results is that where the instruction variable is present there is a corresponding positive effect on the Elaboration dimension of creativity. This is further evidenced by the fact that there is a decrease in the score for Elaboration and Synthesis where instruction is absent. In reference to the effect of the combinations of the variables, the effect of instruction on Elaboration and Synthesis is decreased where either engagement or evaluation are combined with instruction. The opposite effect, meaning a negative impact on a dimension of creativity, was found to be true for the Novelty dimension. Specifically, instruction combined with engagement had the greatest negative impact on Novelty, however, this effect of instruction was significantly mitigated when combined with evaluation. Furthermore, where there is an absence of instruction the score for Novelty increases. In reference to the Uninfluenced dimension, a similar pattern was found Figure 5-9.

Figure 5-9 Combination Variables and Experiment of No Variables



Source: Researcher's survey

## 5.9 Analysis of Elaboration & Synthesis Dimension

The subscales of this dimension are comprised of the following items following (Besemer, 1986): Orderly - Disorderly, Arranged - Disarranged, Organized - Disorganized, Formed - Formless, Complete - Incomplete, Whole - Partial, Sufficient - insufficient, Perfect - Imperfect, Harmonious - Jarring, Graceful - Awkward, Charming - Repelling, Elegant - Coarse Attractive - Unattractive, Intricate - Simple, Complex - Simple, Ornate - Plain, Complicated - Straightforward, Interesting - Boring.

### 5.9.1 Reliability Statistics (Cronbach's Alpha)

The first step of the reliability analysis is indicated in Table 5-5. At the calculation, the Cronbach's Alpha was 0.846.

Table 5-5 Cronbach's Alpha

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.846	.766	18

Table 5-6 Item-Total Statistics

Item-Total Statistics					
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Orderly-Disorderly	37.59	41.454	.828	.846	.815
Arranged-Disarranged	37.64	42.453	.771	.751	.819
Organized-Disorganized	37.59	41.800	.774	.757	.818
Formed-Formless	37.65	42.312	.774	.727	.819
Complete-Incomplete	37.67	42.398	.775	.735	.819
Whole-Partial	37.59	41.871	.767	.763	.819
Sufficient-Insufficient	37.61	42.152	.784	.763	.818
Perfect-Imperfect	37.57	41.759	.823	.839	.815
<b>Harmonious-Jarring</b>	39.49	52.448	.080	.455	.851
<b>Graceful-Awkward</b>	39.36	52.812	.025	.457	.853
<b>Charming-Repelling</b>	39.44	52.482	.071	.365	.851
<b>Elegant-Coarse</b>	39.42	52.582	.055	.406	.852

<b>Attractive-Unattractive</b>	39.44	52.796	.028	.370	.853
<b>Intricate-Simple</b>	39.48	52.267	.102	.416	.850
<b>Complex-Simple</b>	39.40	53.569	-.074	.433	.856
<b>Ornate-Plain</b>	39.45	52.285	.097	.457	.851
<b>Complicated-Straightforward</b>	39.41	53.290	-.038	.476	.855
<b>Interesting-Boring</b>	39.51	52.325	.098	.434	.850

Recalculation of Cronbach's alpha after removing Harmonious - Jarring, Graceful - Awkward, Charming - Repelling, Elegant - Coarse Attractive - Unattractive, Intricate - Simple, Complex - Simple, Ornate - Plain, Complicated - Straightforward, Interesting - Boring items gives a small increase in the Cronbach's alpha, the obtained Cronbach's alpha is presented in Table 5-7.

*Table 5-7 Cronbach's Alpha*

<b>Reliability Statistics</b>		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.956	.956	8

The total item statistics after deleting items, post deletion of some items, is shown in Table 5-8.

*Table 5-8 Item-Total Statistics*

<b>Item-Total Statistics</b>					
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Orderly-Disorderly	22.98	37.433	.869	.844	.947
Arranged-Disarranged	23.03	38.304	.819	.742	.950
Organized-Disorganized	22.98	37.680	.821	.747	.950
Formed-Formless	23.03	38.226	.817	.719	.950
Complete-Incomplete	23.06	38.176	.831	.729	.950
Whole-Partial	22.98	37.725	.816	.756	.951
Sufficient-Insufficient	23.00	38.091	.826	.754	.950
Perfect-Imperfect	22.96	37.776	.860	.837	.948

## 5.9.2 Factor Analysis

Following the Besemer method, the factor analysis for the “Elaboration & Synthesis” dimension has been performed. Initial tests KMO (Table 5-9) indicates good criteria at 0.775, the sample size therefore is adequate and one can perform factor analysis. Bartlett’s test for sphericity, linked to the normal distribution, shows that significance is also good at  $p < 0.001$ .

### 5.9.2.1 Kaiser-Meyer-Olkin (KMO) and Bartlett's Test

*Table 5-9 Kaiser-Meyer-Olkin (KMO) and Bartlett's Test*

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.775
Approx. Chi-Square		5327.311
Bartlett's Test of Sphericity	df	153
	Sig.	.000

### 5.9.2.2 Total Variance Explained

Total variance Explained is indicated in the table below (Table 5-10). The first principal component has 34 percent of total variance, the second 13 percent. These figures are indicated on the scree plot for comparison (Figure 5-10).

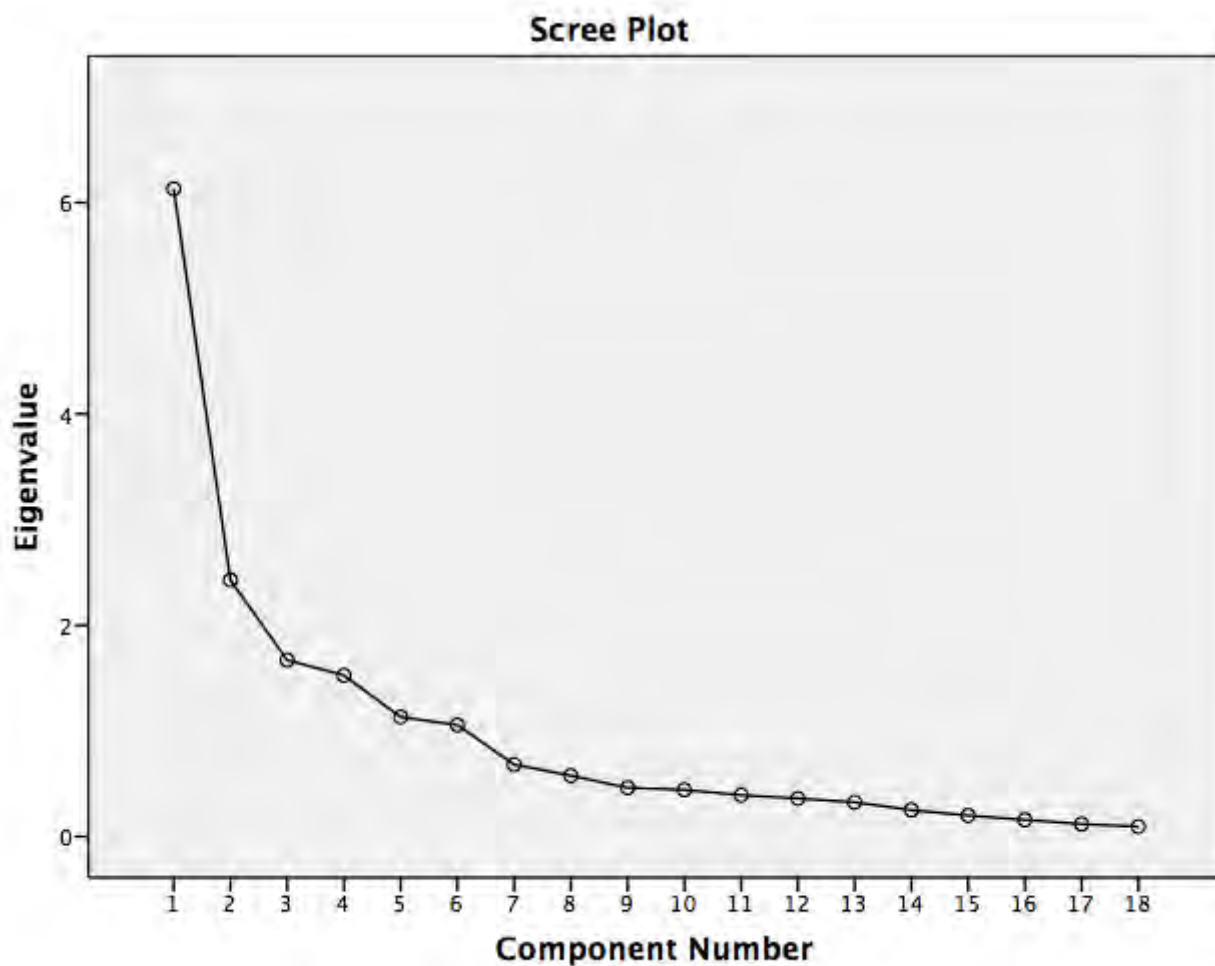
*Table 5-10 Total Variance Explained*

Total Variance Explained									
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	6.130	<b>34.058</b>	34.058	6.130	34.058	34.058	6.124	34.023	34.023
2	2.428	<b>13.491</b>	47.549	2.428	13.491	47.549	2.435	13.526	47.549
3	1.670	9.277	56.826						
4	1.525	8.474	65.300						
5	1.132	6.286	71.587						
6	1.056	5.867	77.454						
7	.681	3.783	81.237						
8	.576	3.201	84.438						
9	.462	2.568	87.006						

10	.443	2.459	89.464						
11	.392	2.178	91.642						
12	.361	2.003	93.646						
13	.324	1.802	95.447						
14	.251	1.394	96.842						
15	.199	1.105	97.947						
16	.158	.879	98.826						
17	.118	.656	99.482						
18	.093	.518	100.000						

Extraction Method: Principal Component Analysis.

Figure 5-10 Pareto diagram for principal component



### 5.9.2.3 Component Matrix

Table 5-11 indicates the relation of principal components to the items used in the present study. Figure 5-11 indicates graphically the impact of the first two principal components.

*Table 5-11 Component Matrix*

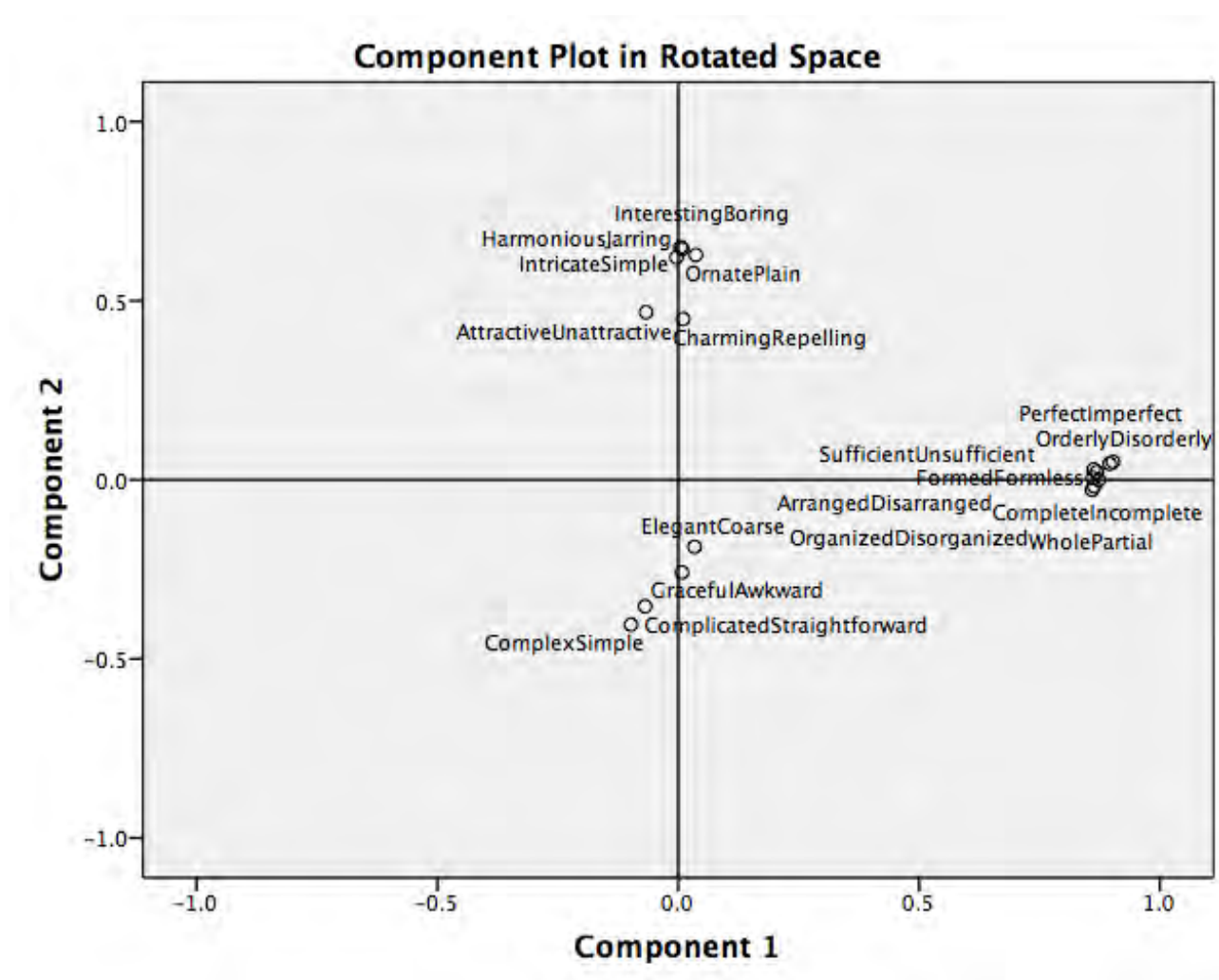
<b>Component Matrix<sup>a</sup></b>		
	Component	
	1	2
Orderly-Disorderly	.904	.013
Arranged-Disarranged	.863	-.006
Organized-Disorganized	.862	-.054
Formed-Formless	.860	-.030
Complete-Incomplete	.872	-.036
Whole-Partial	.857	-.063
Sufficient-Insufficient	.869	-.014
Perfect-Imperfect	.897	.008
Harmonious-Jarring	.022	.621
Graceful-Awkward	-.003	-.258
Charming-Repelling	.029	.448
Elegant-Coarse	.026	-.189
Attractive-Unattractive	-.048	.470
Intricate-Simple	.035	.643
Complex-Simple	-.115	-.400
Ornate-Plain	.062	.626
Complicated-Straightforward	-.083	-.350
Interesting-Boring	.032	.649

Extraction Method: Principal Component Analysis.

a. 2 components extracted.



Figure 5-11 The items on the plane of the first two principal components



### 5.9.3 Analysis of Fractional Factorial Design

#### 5.9.3.1 Multiple Response Regression

The P value showed statistical significance for all of the experiments. Moreover, the result for  $R^2$  was high at 0.7994 indicating statistical significance Table 5-12. All coefficient values on table 12 are correct except the combination of instruction and engagement in variables. They are correct because they are statistically significant as indicated by the p values, which are less than 0.05.

Table 5-12 Multiple Response Regression

Y-hat Model		Elaboration & Synthesis			Active
Factor	Name	Coefficient	P(2 Tail)	Tolerance	

Constant		120.50	0.0000		
A	Instruction	13.833	0.0000	1	X
B	Engagement	7.833	0.0000	1	X
C	Evaluation	3.833	0.0000	1	X
AB		0.16667	0.8255	1	X
AC		-2.500	0.0012	1	X
BC		-5.611	0.0000	1	X
ABC		1.833	0.0164	1	X
<b>R<sup>2</sup></b>		<b>0.7994</b>			
<b>Adj R<sup>2</sup></b>		0.7890			
<b>Std Error</b>		9.0555			
<b>F</b>		77.4023			
<b>Sig F</b>		0.0000			
<b>F<sub>LOF</sub></b>		NA			
<b>Sig F<sub>LOF</sub></b>		NA			
<b>Source</b>		<b>SS</b>	<b>df</b>	<b>MS</b>	
<b>Regression</b>		44429.8	7	6347.1	
<b>Error</b>		11152.2	136	82.0	
<b>Error<sub>Pure</sub></b>		11152.2	136	82.0	
<b>Error<sub>LOF</sub></b>		0.0	0	NA	
<b>Total</b>		55582.0	143		

### 5.9.3.2 Analysis of Variance (ANOVA)

Using ANOVA the P values also indicated statistical significance Table 5-13.

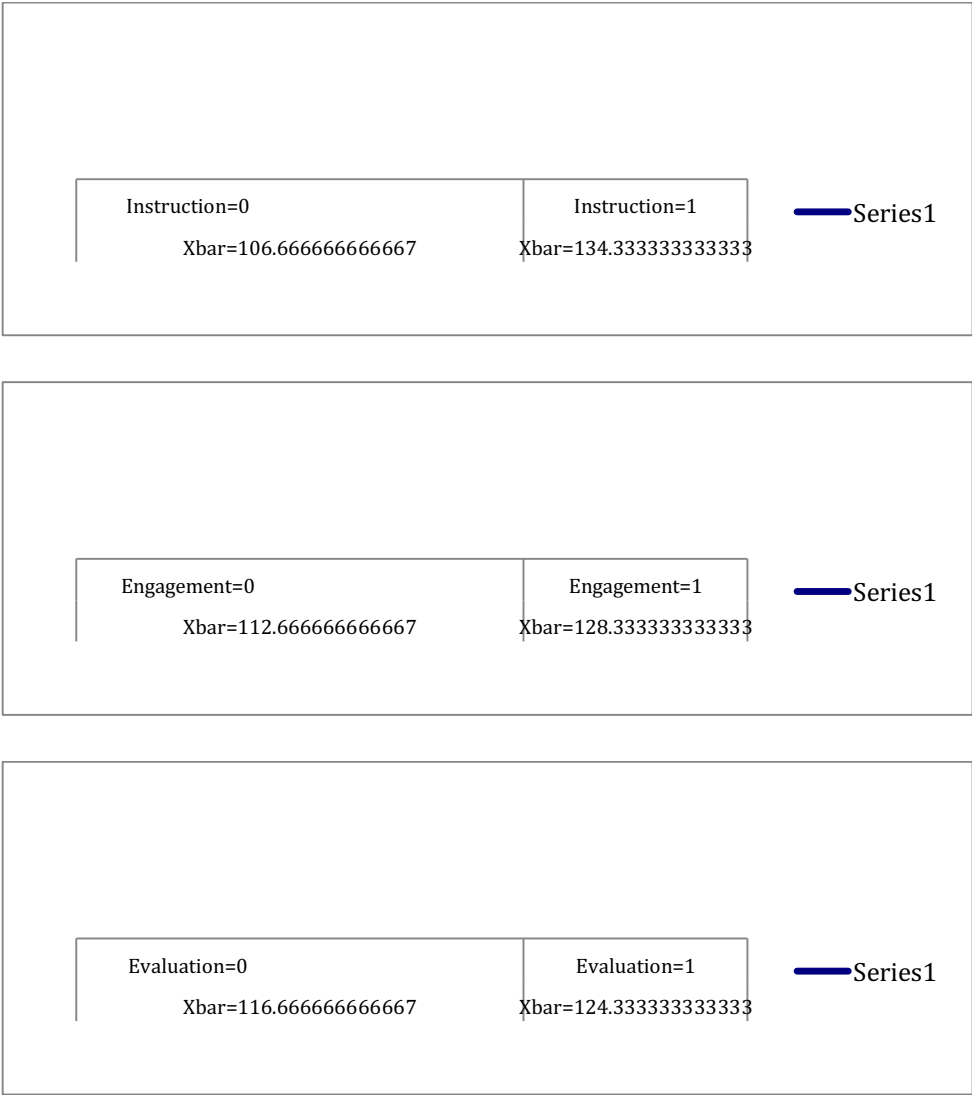
Table 5-13 ANOVA

Source	Sum of Squares	Degrees of Freedom	Creativity			
			Mean of Squares	F values	P values	% Contribute
Instruction	27556.0	1	27556.0	336.042	0.000	49.58%
Engagement	8836.0	1	8836.0	107.754	0.000	15.90%
Evaluation	2116.0	1	2116.0	25.804	0.000	3.81%
AB	4.0000	1	4.0000	0.049	0.826	0.01%
AC	900.0	1	900.0	10.975	0.001	1.62%
BC	4533.8	1	4533.8	55.289	0.000	8.16%
ABC	484.0	1	484.0	5.902	0.016	0.87%
Error	11152.222	136	82.002			20.06%
Total	55582.000	143				

5.9.3.3 Least-Significant Difference Test

In the graphic below (Figure 5-12) there is no blue line for each of the three experiment variables, this means that there is a statistical difference between these three variables. This indicates that there is a statistically significant difference in creativity of creativity between the experiments.

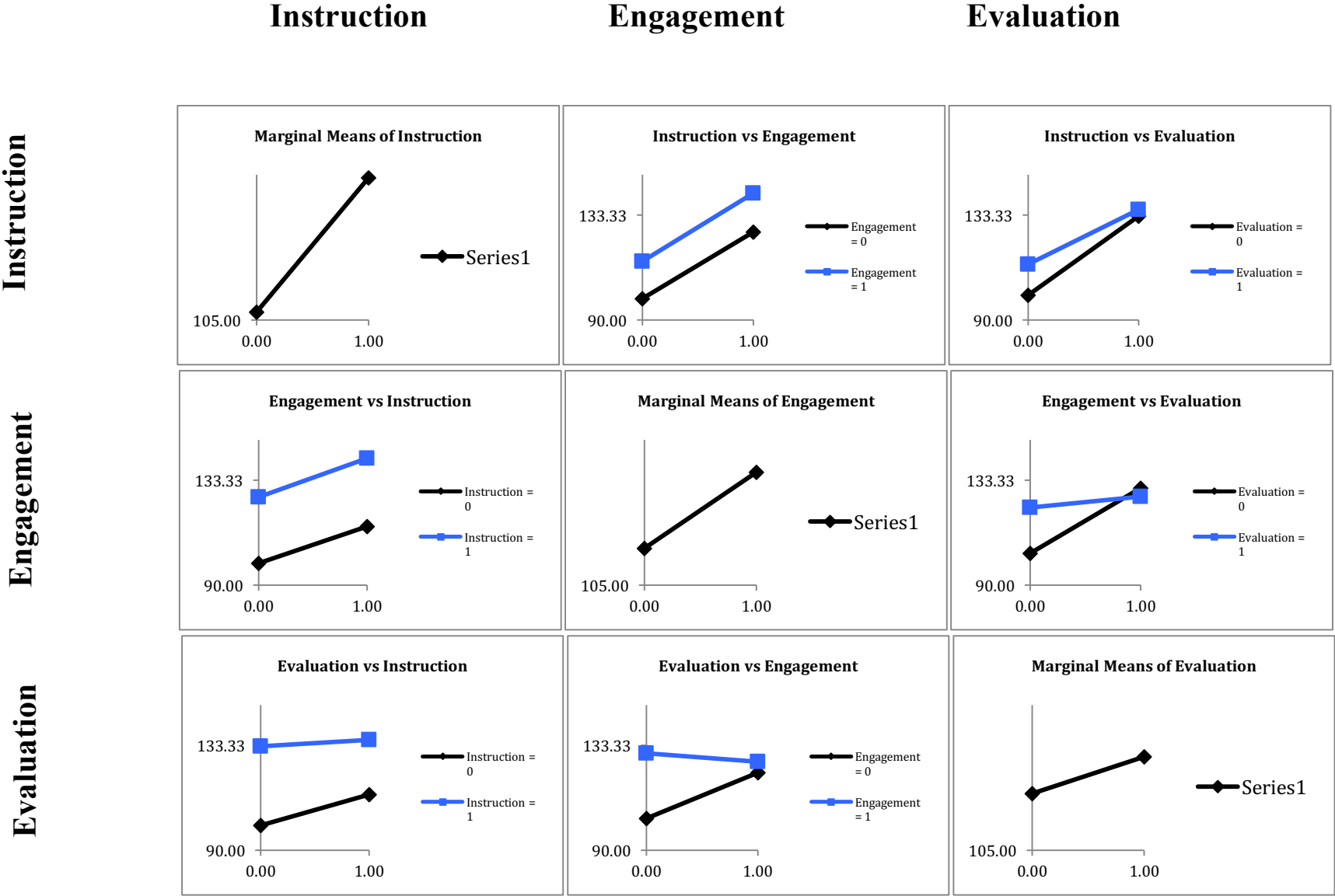
Figure 5-12 Least Significant Differences Test



#### **5.9.3.4 Multiple Plot of Statapult Data**

The multiple plot is confirming results discussed before graphically, illustrating details on one screen all the marginal means plot and all the interaction combinations Figure 5-13. The analysis here shows that there is an interaction between engagement and evaluation which supports that they have a strong effect on each other. There is a weaker effect is found between instruction and evaluation. Where instruction and engagement are tested together, the plot lines for each are parallel to each other which indicates that these variables do not have an effect on each other.

Figure 5-13 Multiple Plot of Stataput Date



## 5.10 Analysis of Novelty Dimension

The subscales of this dimension are comprised of the following items following (Besemer, 1986): Exciting - Dull, Zippy - Bland, Fresh - Overused, Eccentric - Conventional, New - Old, Novel - Predictable, Unusual - Usual, Unique Ordinary, Original - Commonplace, Startling - Stale, Surprising - Customary, Astonishing - Commonplace, Astounding - Common, Shocking - Ordinary, Unexpected - Expected, Trendsetting - Warmed over, Revolutionary - Average, Radical - Oldhat.

### 5.10.1 Reliability Statistics (Cronbach's Alpha)

The first step of the reliability analysis is indicated in Table 5-14. At the calculation, the Cronbach's Alpha was 0.981.

*Table 5-14 Cronbach's Alpha*

**Reliability Statistics**

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.981	.981	18

*Table 5-15 Item-Total Statistics*

**Item-Total Statistics**

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Exciting-Dull	43.75	275.430	.937	.937	.979
Zippy-Bland	43.79	277.795	.876	.783	.980
Fresh-Overused	43.88	277.685	.828	.762	.980
Eccentric-Conventional	43.82	277.206	.846	.756	.980
New-Old	43.71	276.686	.785	.737	.981
Novel-Predictable	43.74	277.163	.808	.762	.981
Unusual-Usual	43.79	276.984	.851	.801	.980
Unique-Ordinary	43.77	278.091	.860	.778	.980
Original-Commonplace	43.77	275.417	.933	.929	.979
Startling-Stale	43.79	277.982	.916	.891	.979
Surprising-Customary	43.81	281.626	.787	.766	.981

Astonishing-Commonplace	43.77	280.589	.832	.766	.980
Astounding-Common	43.79	279.524	.835	.769	.980
Shocking-Ordinary	43.80	280.948	.807	.790	.980
Unexpected-Expected	43.77	278.119	.907	.895	.979
Trendsetting-Warmed Over	43.81	276.734	.905	.927	.979
Revolutionary-Average	43.74	280.667	.769	.655	.981
Radical-Old hat	43.81	276.383	.911	.940	.979

## 5.10.2 Factor Analysis

The factor analysis for the Novelty dimension (Table 5-16) indicates good KMO measure at 0.963, the sample size is adequate and we can perform factor analysis. Bartlett's test for sphericity shows that significance is also good at  $p < 0.001$ .

### 5.10.2.1 Kaiser-Meyer-Olkin (KMO) and Bartlett's Test

Table 5-16 Kaiser-Meyer-Olkin (KMO) and Bartlett's Test

KMO and Bartlett's Test	
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	.963
Approx. Chi-Square	12458.868
Bartlett's Test of Sphericity	df
	153
	Sig.
	.000

### 5.10.2.2 Total Variance Explained

Total variance Explained is indicated in the table below (Table 5-17). The first principal component has 76 percent of total variance. These figures are indicated on the scree plot for comparison (Figure 5-14).

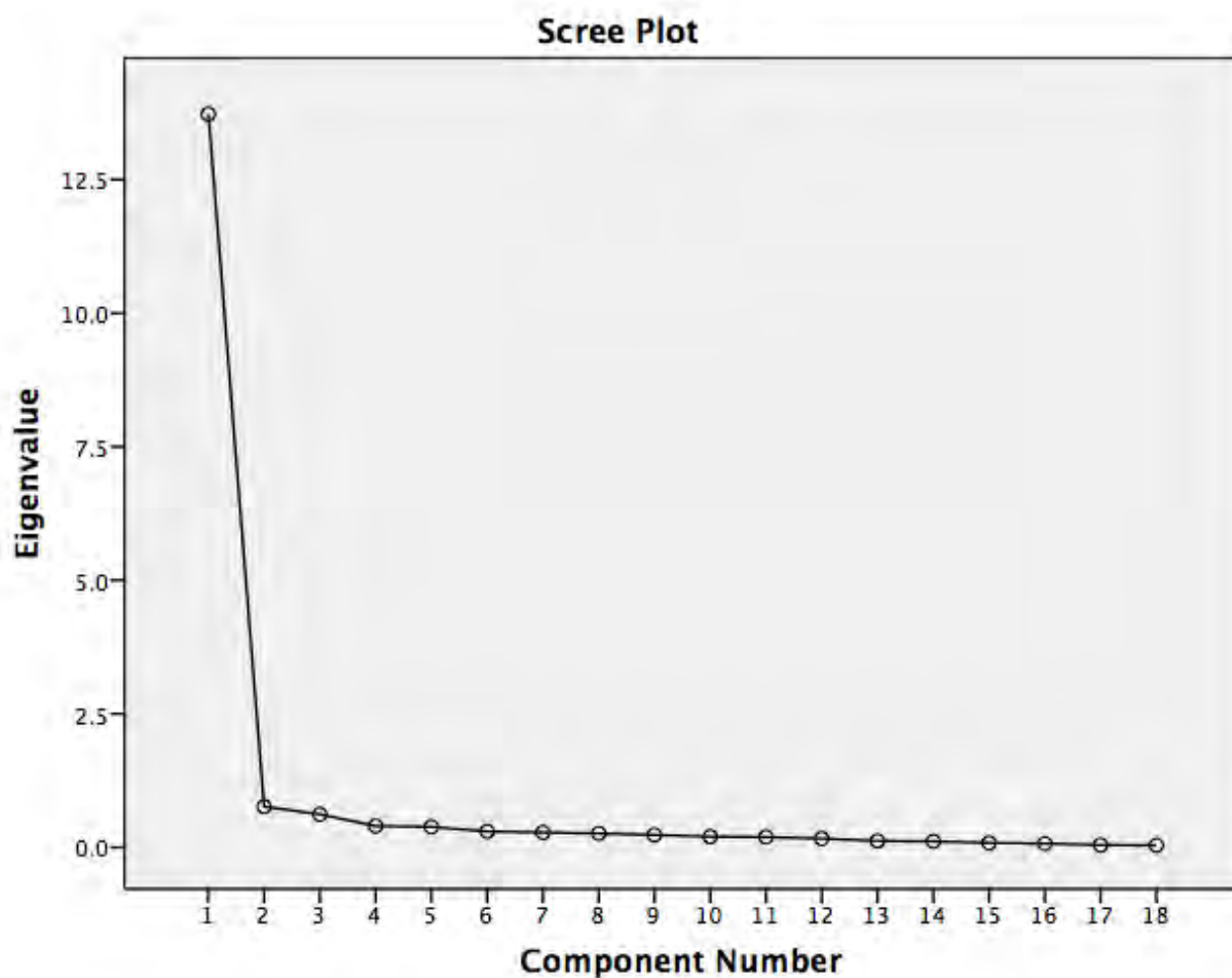
Table 5-17 Total Variance Explained

Total Variance Explained						
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	13.722	<b>76.236</b>	76.236	13.722	76.236	76.236
2	.764	4.244	80.479			
3	.618	3.435	83.915			
4	.401	2.230	86.145			
5	.385	2.137	88.282			

6	.299	1.659	89.942		
7	.281	1.559	91.501		
8	.261	1.453	92.953		
9	.234	1.302	94.255		
10	.201	1.118	95.373		
11	.193	1.072	96.444		
12	.165	.915	97.360		
13	.121	.673	98.033		
14	.114	.634	98.667		
15	.085	.470	99.137		
16	.071	.396	99.532		
17	.045	.248	99.780		
18	.040	.220	100.000		

Extraction Method: Principal Component Analysis.

Figure 5-14 Pareto diagram for principal component





### 5.10.2.3 Component Matrix

Table 5-18 indicates the relation of principal components to the items used in the present study.

*Table 5-18 Component Matrix*

<b>Component Matrix<sup>a</sup></b>	
	Component
	1
Exciting-Dull	.948
Zippy-Bland	.891
Fresh-Overused	.844
Eccentric-Conventional	.862
New-Old	.805
Novel-Predictable	.826
Unusual-Usual	.867
Unique-Ordinary	.875
Original-Commonplace	.944
Startling-Stale	.929
Surprising-Customary	.809
Astonishing-Commonplace	.851
Astounding-Common	.854
Shocking-Ordinary	.827
Unexpected-Expected	.921
Trendsetting-Warmed Over	.920
Revolutionary-Average	.792
Radical-Old hat	.926

Extraction Method: Principal Component Analysis.

a. 1 components extracted.

### 5.10.3 Analysis of Fractional Factorial Design

#### 5.10.3.1 Multiple Response Regression

The P value showed statistical significance for all of the experiments. Moreover, the result for  $R^2$  was high at 0.9111 indicating statistical significance Table 5-19. All coefficient values on table 28 are correct because they are statistically significant indicated by the p value, which is less than 0.05.

Table 5-19 Multiple Response Regression

Y-hat Model		Novelty			Active
Factor	Name	Coefficient	P(2 Tail)	Tolerance	
Constant		145.72	0.0000		
A	Instruction	-33.993	0.0000	1	X
B	Engagement	-17.701	0.0000	1	X
C	Evaluation	4.715	0.0001	1	X
AB		-4.493	0.0002	1	X
AC		13.007	0.0000	1	X
BC		5.299	0.0000	1	X
ABC		-14.493	0.0000	1	X
<b>R<sup>2</sup></b> <b>Adj R<sup>2</sup></b> <b>Std Error</b> <b>F</b> <b>Sig F</b> <b>F<sub>LOF</sub></b> <b>Sig F<sub>LOF</sub></b>		<b>0.9111</b> 0.9066 14.0765 199.1868 0.0000 NA NA			
<b>Source</b>		<b>SS</b>	<b>df</b>	<b>MS</b>	
<b>Regression</b>		276277.4	7	39468.2	
<b>Error</b>		26947.9	136	198.1	
<b>Error<sub>Pure</sub></b>		26947.9	136	198.1	
<b>Error<sub>LOF</sub></b>		0.0	0	NA	
<b>Total</b>		303225.3	143		

### 5.10.3.2 Analysis of Variance (ANOVA)

Using ANOVA the P values also indicated statistical significance Table 5-20.

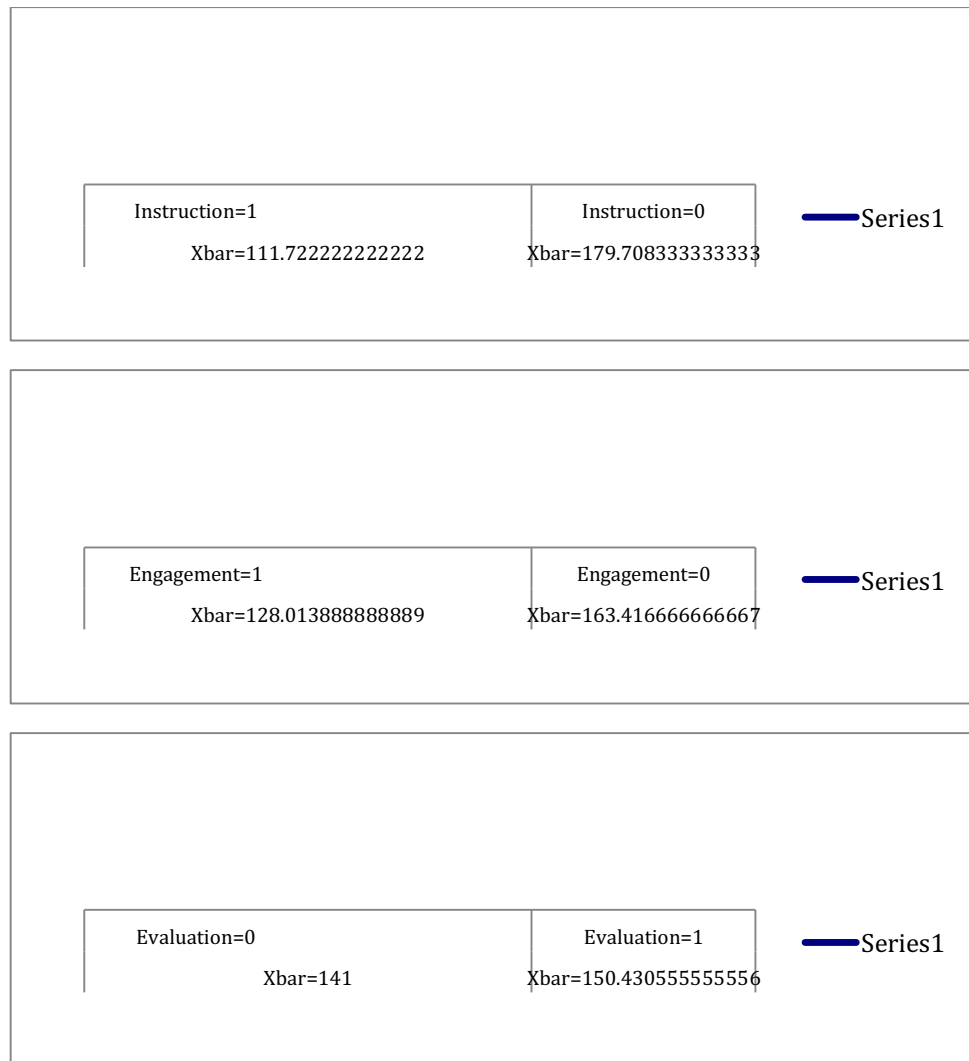
Table 5-20 ANOVA

Creativity						
Source	Source	Source	Source	Source	Source	Source
Instruction	166396.0	1	166396.0	839.762	0.000	54.88%
Engagement	45120.8	1	45120.8	227.714	0.000	14.88%
Evaluation	3201.7	1	3201.7	16.158	0.000	1.06%
AB	2907.0	1	2907.0	14.671	0.000	0.96%
AC	24362.0	1	24362.0	122.949	0.000	8.03%
BC	4042.8	1	4042.8	20.403	0.000	1.33%
ABC	30247.0	1	30247.0	152.650	0.000	9.98%
Error	26947.944	136	198.147			8.89%
Total	303225.326	143				

### 5.10.3.3 Least-Significant Difference Test

In the graphic below (Figure 5-15) there is no blue line for each of the three experiment variables, this means that there is a statistical difference between these three variables. This indicates that there is a statistically significant difference in creativity of creativity between the experiments.

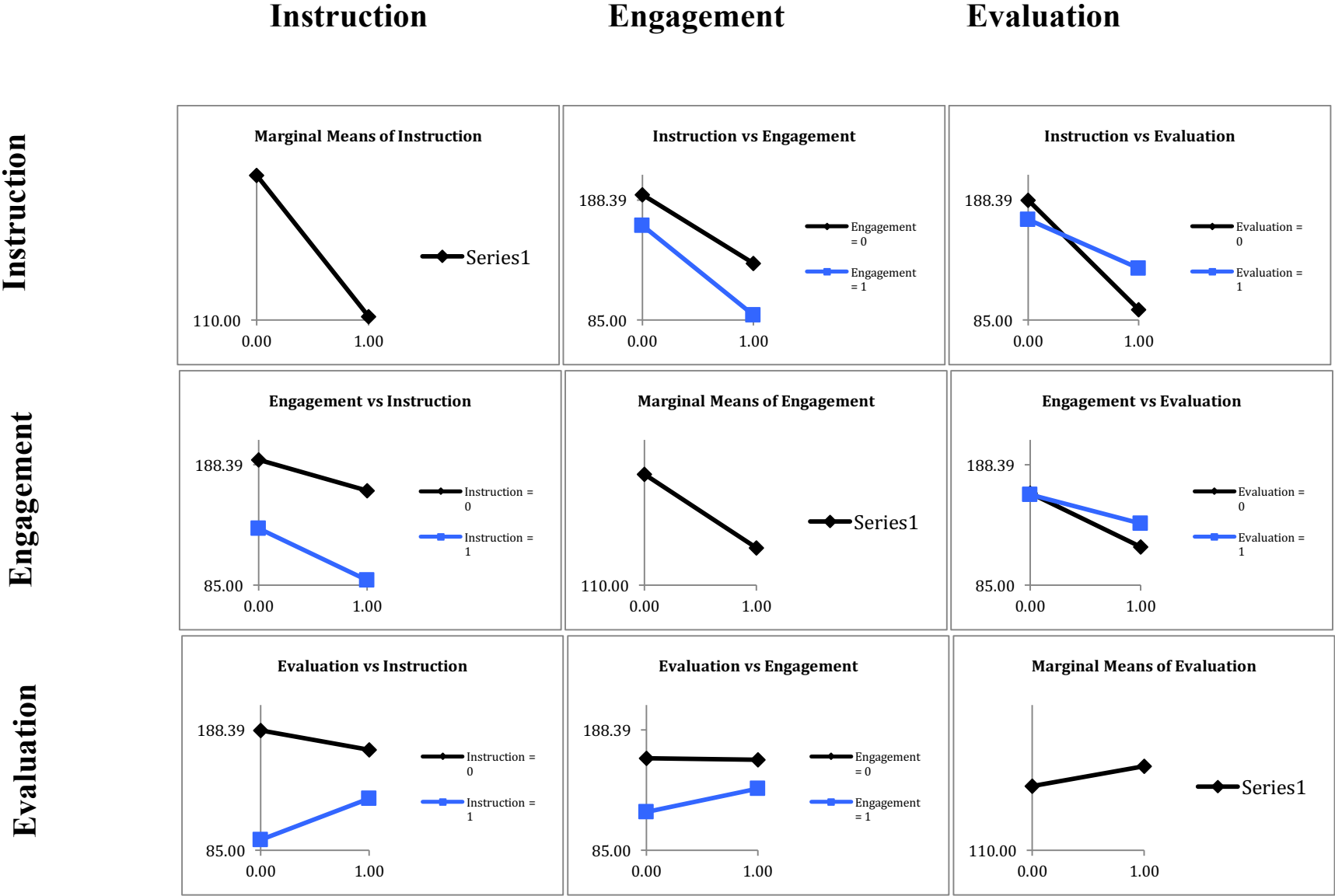
Figure 5-15 Least Significant Differences Test



#### 5.10.3.4 Multiple Plot of Stataput Date

The multiple plot is confirming results discussed before graphically, illustrating details on one screen all the marginal means plot and all the interaction combinations Figure 5-16. The analysis here shows that there is an interaction between instruction and evaluation, which supports that they have a strong effect on each other. There is a weaker effect is found between engagement and evaluation.

Figure 5-16 Multiple Plot of Stataput Date



## 5.11 Analysis of Uninfluenced Dimension

The subscale (Pure) of this dimension (Uninfluenced) is comprised of the following items: Pure - Influenced, Natural - Unnatural, Free - Restricted, Unbiased - Biased, Undirected - Directed, Candid - Tactful, Natural - Affected.

### 5.11.1 Reliability Statistics (Cronbach's Alpha)

The first step of the reliability analysis is indicated in Table 5-21. At the calculation, the Cronbach's Alpha was 0.950.

*Table 5-21 Cronbach's Alpha*

**Reliability Statistics**

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.950	.950	7

*Table 5-22 Item-Total Statistics*

**Item-Total Statistics**

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Pure-Influenced	15.76	27.249	.859	.872	.939
Natural-Unnatural	15.71	27.584	.822	.748	.942
Free-Restricted	15.78	27.657	.807	.699	.944
Unbiased-Biased	15.78	27.617	.815	.721	.943
Undirected-Directed	15.78	27.561	.817	.729	.943
Candid-Tactful	15.70	27.409	.820	.736	.943
Natural-Affected	15.76	27.310	.863	.875	.939

### 5.11.2 Factor Analysis

The factor analysis for the Uninfluenced dimension (Table 5-23) indicates good KMO measure at 0.880, the sample size is adequate and we can perform factor analysis. Bartlett's test for sphericity shows that significance is also good at  $p < 0.001$ .

#### 5.11.2.1 Kaiser-Meyer-Olkin (KMO) and Bartlett's Test

Table 5-23 Kaiser-Meyer-Olkin (KMO) and Bartlett's Test

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.880
Approx. Chi-Square		3528.474
Bartlett's Test of Sphericity	df	21
	Sig.	.000

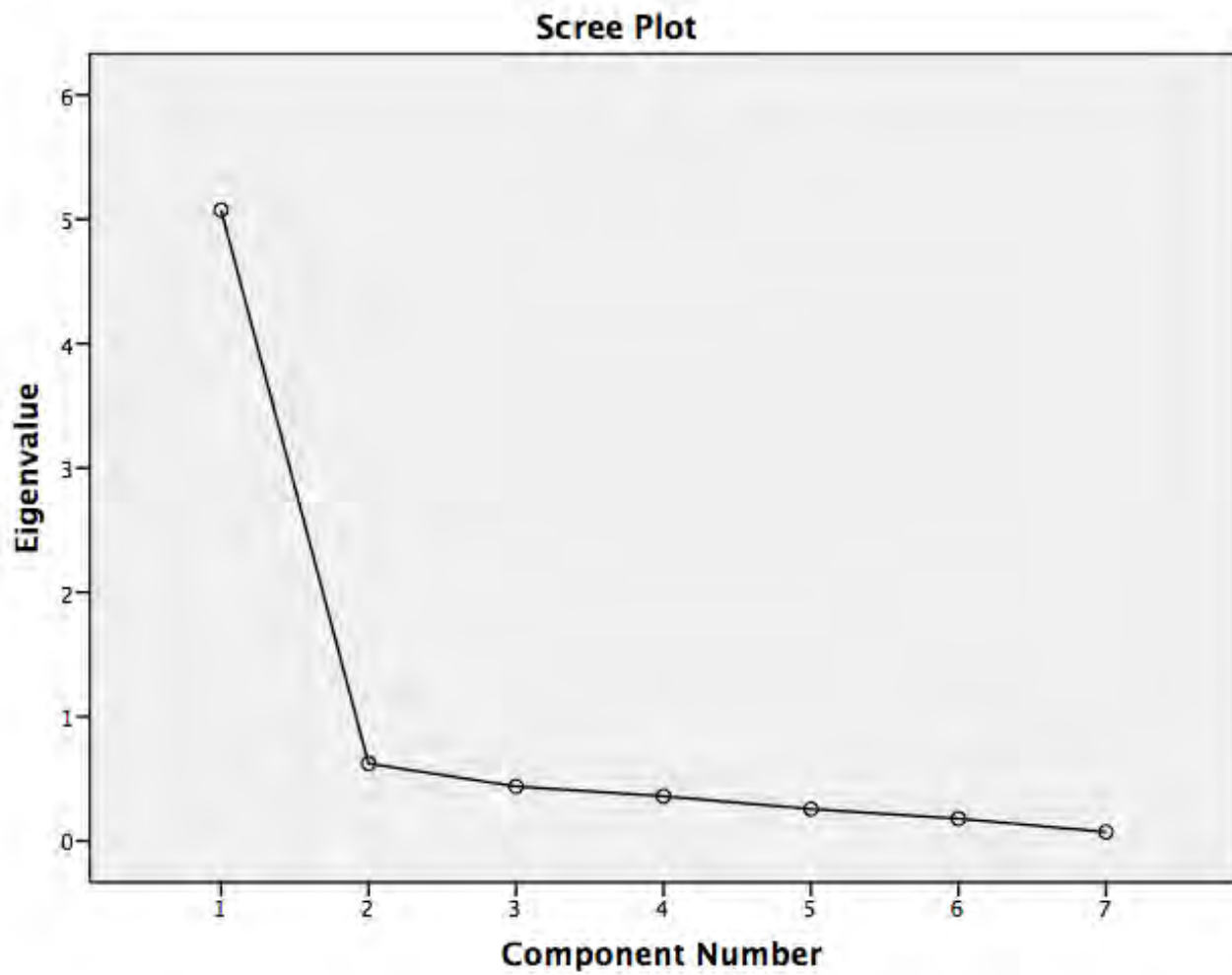
#### 5.11.2.2 Total Variance Explained

Total variance Explained is indicated in the table below (Table 5-24). The first principal component has 72 percent of total variance. These figures are indicated on the scree plot for comparison (Figure 5-17).

Table 5-24 Total Variance Explained

Total Variance Explained						
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	5.381	<b>76.876</b>	76.876	5.381	76.876	76.876
2	.506	7.226	84.102			
3	.363	5.186	89.288			
4	.345	4.926	94.214			
5	.191	2.725	96.939			
6	.143	2.049	98.989			
7	.071	1.011	100.000			

Figure 5-17 Pareto diagram for principal component



### 5.11.2.3 Component Matrix

Table 5-25 indicates the relation of principal components to the items used in the present study.

Table 5-25 Component Matrix

Component Matrix <sup>a</sup>	
	Component
	1
Pure-Influenced	.901
Natural-Unnatural	.871
Free-Restricted	.859
Unbiased-Biased	.865
Undirected-Directed	.868
Candid-Tactful	.868
Natural-Affected	.904



### 5.11.3 Analysis of Fractional Factorial Design

#### 5.11.3.1 Multiple Response Regression

The P value showed statistical significance for all of the experiments. Moreover, the result for  $R^2$  was high at 0.8820 indicating statistical significance Table 5-26. All coefficient values on Table 5-26 are correct except the combination of instruction and engagement in variables. They are correct because they are statistically significant as indicated by the p values, which are less than 0.05.

Table 5-26 Multiple Response Regression

Y-hat Model		Uninfluenced			Active
Factor	Name	Coefficient	P(2 Tail)	Tolerance	
Constant		57.069	0.0000		
A	Instruction	-12.056	0.0000	1	X
B	Engagement	-6.806	0.0000	1	X
C	Evaluation	-3.500	0.0000	1	X
AB		-0.09722	0.8397	1	X
AC		2.042	0.0000	1	X
BC		4.764	0.0000	1	X
ABC		-1.750	0.0004	1	X
<b>R<sup>2</sup></b>		<b>0.8820</b>			
<b>Adj R<sup>2</sup></b>		0.8759			
<b>Std Error</b>		5.7553			
<b>F</b>		145.2256			
<b>Sig F</b>		0.0000			
<b>F<sub>LOF</sub></b>		NA			
<b>Sig F<sub>LOF</sub></b>		NA			
<b>Source</b>		<b>SS</b>	<b>df</b>	<b>MS</b>	
<b>Regression</b>		33672.5	7	4810.4	
<b>Error</b>		4504.8	136	33.1	
<b>Error<sub>Pure</sub></b>		4504.8	136	33.1	
<b>Error<sub>LOF</sub></b>		0.0	0	NA	
<b>Total</b>		38177.3	143		

### 5.11.3.2 Analysis of Variance (ANOVA)

Using ANOVA the P values also indicated statistical significance Table 5-27.

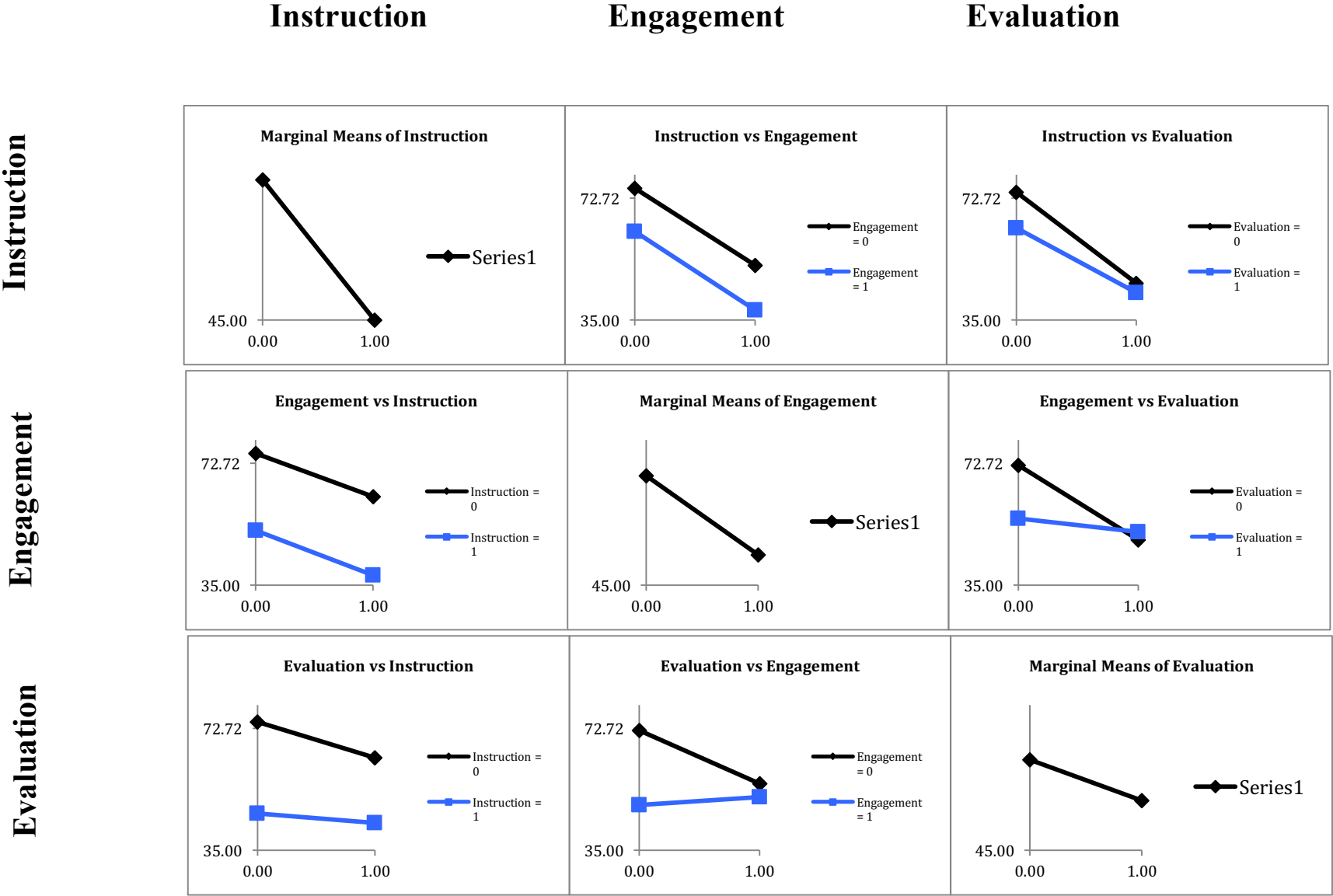
Table 5-27 ANOVA

Creativity						
Source	Source	Source	Source	Source	Source	Source
Instruction	20928.4	1	20928.4	631.833	0.000	54.82%
Engagement	6669.4	1	6669.4	201.352	0.000	17.47%
Evaluation	1764.0	1	1764.0	53.255	0.000	4.62%
AB	1.3611	1	1.3611	0.041	0.840	0.00%
AC	600.3	1	600.3	18.122	0.000	1.57%
BC	3268.0	1	3268.0	98.662	0.000	8.56%
ABC	441.0	1	441.0	13.314	0.000	1.16%
Error	4504.778	136	33.123			11.80%
Total	38177.306	143				

### 5.11.3.3 Multiple Plot of Stataput Date

The multiple plot is confirming results discussed before graphically, illustrating details on one screen all the marginal means plot and all the interaction combinations Figure 5-18. The analysis here shows that there is an interaction between engagement and evaluation, which supports that they have a strong effect on each other. There is a weaker effect is found between instruction and evaluation. Where instruction and engagement are tested together, the plot lines for each are parallel to each other which indicates that these variables do not have an effect on each other.

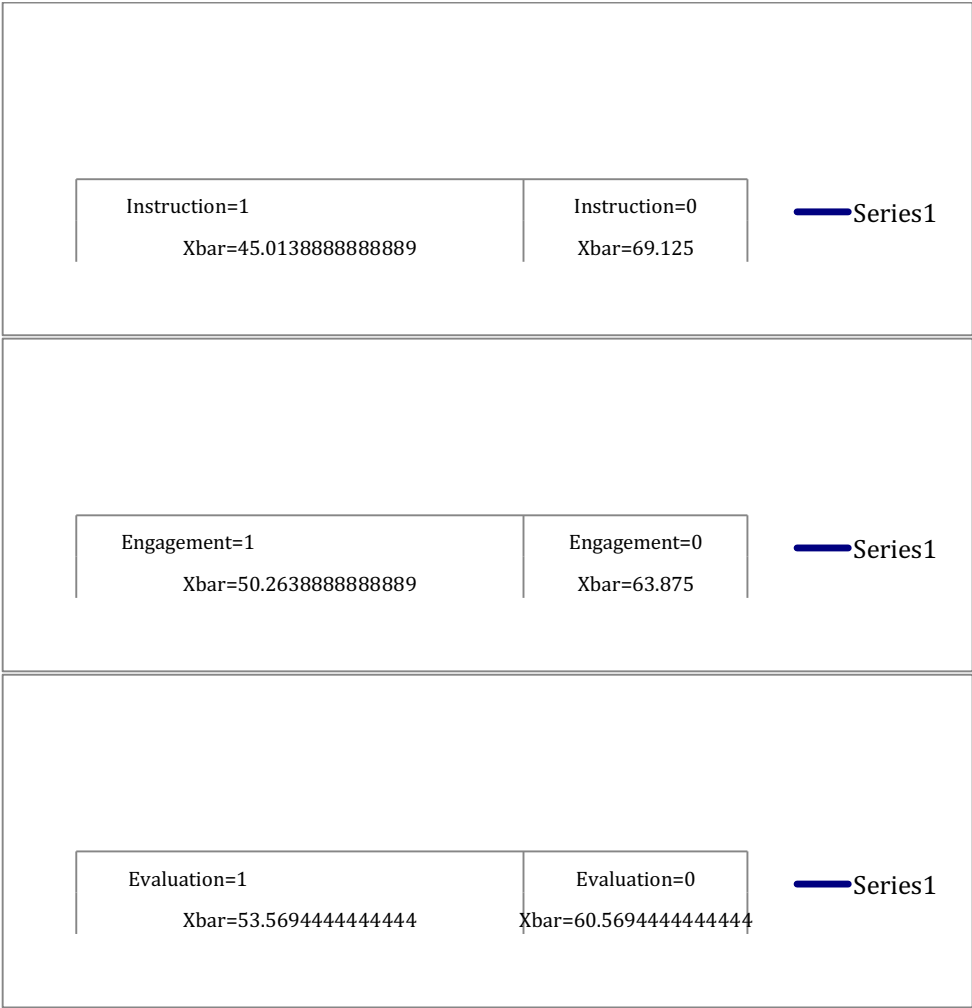
Figure 5-18 Multiple Plot of Stataput Date



5.11.3.4 Least-Significant Difference Test

In the graphic below (Figure 5-19) there is no blue line for each of the three experiment variables, this means that there is a statistical difference between these three variables. This indicates that there is a statistically significant difference in creativity of creativity between the experiments.

Figure 5-19 Least Significant Differences Test



## 5.12 Analysis of Control Group and Non Variables

### 5.12.1 Reliability Statistics (Cronbach's Alpha)

The first step of the reliability analysis is indicated in Table 5-28. At the calculation, the Cronbach's Alpha was 0.738.

*Table 5-28 Cronbach's Alpha*

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.738	.804	43

### 5.12.2 Factor Analysis

The factor analysis for the Uninfluenced dimension (Table 5-29) indicates good KMO measure at 0.878, the sample size is adequate and we can perform factor analysis. Bartlett's test for sphericity shows that significance is also good at  $p < 0.001$ .

#### 5.12.2.1 Kaiser-Meyer-Olkin (KMO) and Bartlett's Test

*Table 5-29 Kaiser-Meyer-Olkin (KMO) and Bartlett's Test*

KMO and Bartlett's Test	
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	.878
Approx. Chi-Square	9757.125
Bartlett's Test of Sphericity df	903
Sig.	.000

### 5.12.2.2 Total Variance Explained

Total variance Explained is indicated in the table below (Table 5-30). The first principal component has 72 percent of total variance. These figures are indicated on the scree plot for comparison (Figure 5-20)

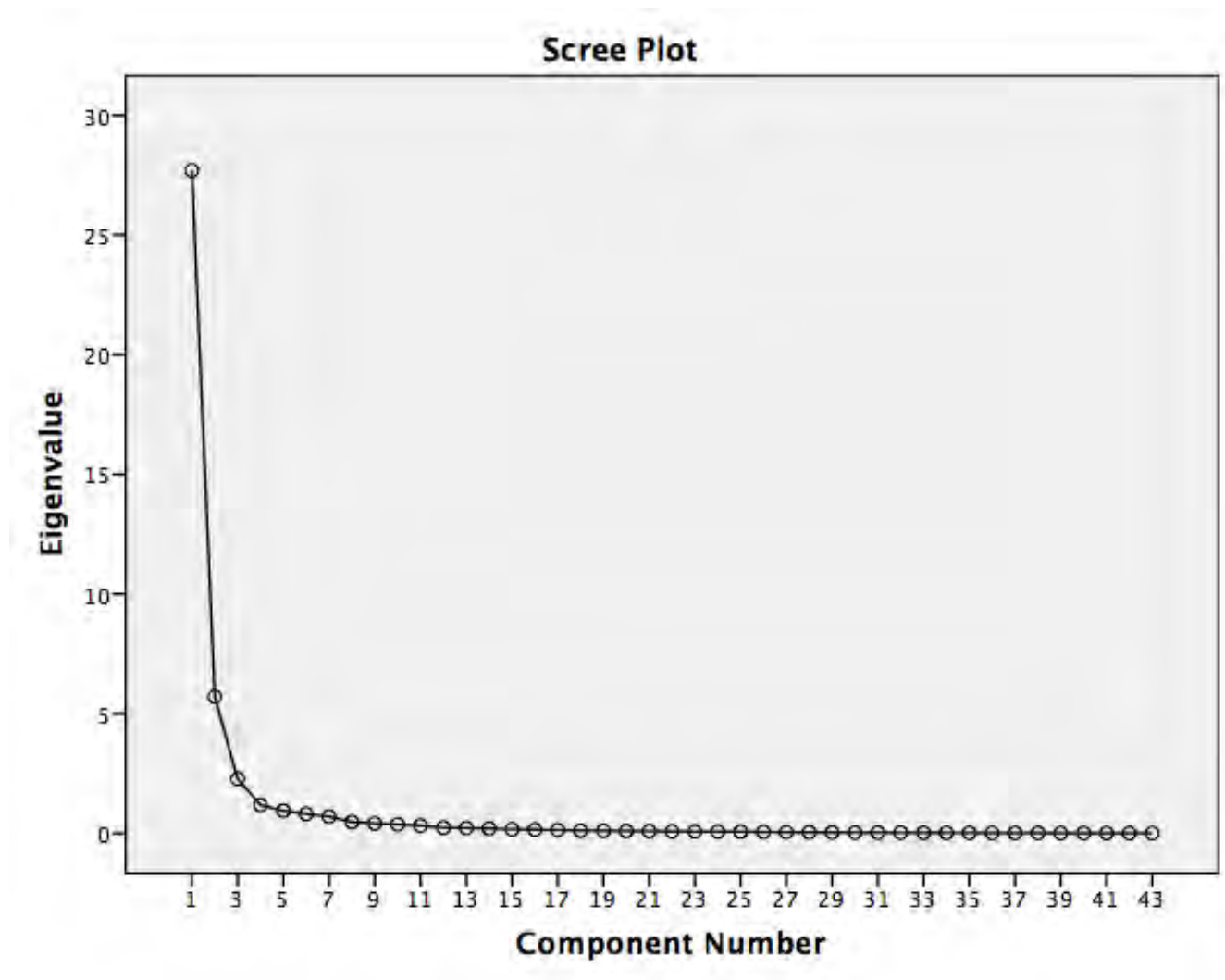
*Table 5-30 Total Variance Explained*

Component	Total Variance Explained								
	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	27.694	64.406	64.406	27.694	64.406	64.406	15.785	36.709	36.709
2	5.709	13.276	77.681	5.709	13.276	77.681	14.193	33.006	69.715
3	2.276	5.293	82.974	2.276	5.293	82.974	5.701	13.259	82.974
4	1.181	2.746	85.720						
5	.939	2.185	87.905						
6	.807	1.876	89.781						
7	.697	1.621	91.402						
8	.469	1.091	92.492						
9	.409	.952	93.444						
10	.370	.860	94.304						
11	.321	.747	95.051						
12	.234	.543	95.594						
13	.219	.510	96.104						
14	.198	.461	96.565						
15	.166	.386	96.951						
16	.150	.350	97.300						
17	.135	.315	97.615						
18	.112	.261	97.876						
19	.105	.244	98.120						
20	.096	.223	98.343						
21	.087	.203	98.546						
22	.077	.179	98.725						
23	.071	.165	98.890						
24	.067	.156	99.046						
25	.063	.145	99.191						
26	.051	.118	99.309						
27	.045	.104	99.413						
28	.039	.090	99.503						
29	.033	.077	99.581						
30	.029	.068	99.648						
31	.027	.063	99.712						

32	.023	.054	99.765						
33	.019	.045	99.810						
34	.017	.040	99.850						
35	.014	.033	99.884						
36	.012	.029	99.912						
37	.010	.023	99.936						
38	.008	.019	99.955						
39	.006	.013	99.968						
40	.005	.011	99.979						
41	.004	.008	99.987						
42	.003	.007	99.994						
43	.002	.006	100.000						

Extraction Method: Principal Component Analysis.

Figure 5-20 Pareto diagram for principal component



### 5.12.2.3 Component Matrix

Table 5-31 indicates the relation of principal components to the items used in the present study. Figure 5-21 indicates graphically the impact of the first two principal components.

*Table 5-31 Component Matrix*

<b>Component Matrix<sup>a</sup></b>			
	Component		
	1	2	3
Orderly-Disorderly	-.900	.223	.280
Arranged-Disarranged	-.904	.203	.230
Organized-Disorganized	-.882	.214	.240
Formed-Formless	-.893	.203	.272
Complete-Incomplete	-.892	.207	.254
Whole-Partial	-.887	.203	.289
Sufficient-Insufficient	-.883	.207	.313
Perfect-Imperfect	-.900	.220	.286
Harmonious-Jarring	.113	.734	-.222
Graceful-Awkward	.181	.637	-.105
Charming-Repelling	.061	.711	-.149
Elegant-Coarse	.173	.598	-.210
Attractive-Unattractive	.162	.769	-.206
Intricate-Simple	.206	.748	-.133
Complex-Simple	.233	.588	-.131
Ornate-Plain	.098	.780	-.231
Complicated-Straightforward	.117	.607	-.140
Interesting-Boring	.170	.802	-.160
Exciting-Dull	.942	.110	.257
Zippy-Bland	.928	.083	.223
Fresh-Overused	.934	.110	.189
Eccentric-Conventional	.922	.058	.249
New-Old	.918	.118	.227
Novel-Predictable	.939	.083	.191
Unusual-Usual	.923	.122	.229
Unique-Ordinary	.927	.110	.201
Original-Commonplace	.930	.102	.266
Startling-Stale	.929	.116	.270
Surprising-Customary	.902	.090	.189
Astonishing-Commonplace	.912	.091	.207
Astounding-Common	.917	.108	.220
Shocking-Ordinary	.911	.078	.165
Unexpected-Expected	.940	.119	.257

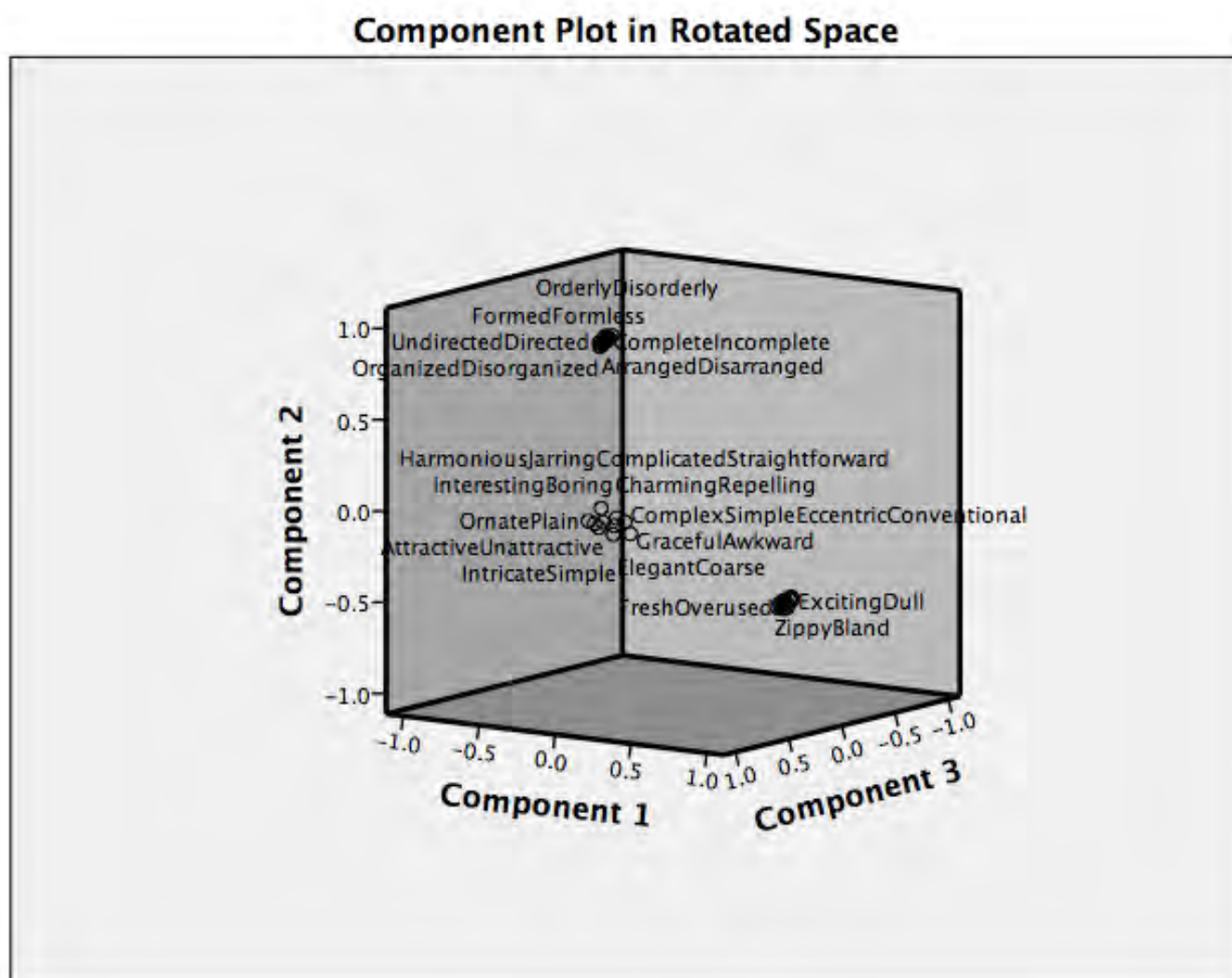


Trendsetting-WarmedOver	.931	.111	.256
Revolutionary-Average	.935	.054	.199
Radical-Oldhat	.933	.102	.264
Pure-Influenced	-.902	.194	.283
Natural-Unnatural	-.896	.189	.239
Free-Restricted	-.885	.210	.241
Unbiased-Biased	-.895	.175	.265
Undirected-Directed	-.881	.211	.223
Candid-Tactful	-.908	.162	.251
Natural-Affected	-.904	.179	.265

Extraction Method: Principal Component Analysis.

a. 3 components extracted.

Figure 5-21 The items on the plane of the first three principal components



### 5.12.3 Chi-square test

The Chi-square test is a test for statistical significance to show that there is a relationship between two variables; in this study the variables are the presence or absence of an adult and the level of creativity. The Chi-square test was carried out to compare the difference between the creativity of the children under control group and non-variables. The Chi-square test for significance gave a p-value = 0,00000000000462, where  $< 0.05$  is significant. This indicates that there is a significant difference between the creativity values indicating that control group where there is the involvement of adults has an impact on the creativity of the children.

### 5.13 Discussion

In this chapter data was statistically analysed for each dimension and for all associated with these dimension's subscales. This analysis of the data was conducted for all of the experiments and for individual variable experiments where each variable was tested individually, in combination with another variable, all variables together and no variable at all.

The reliability of the data was tested using Cronbach's Alpha criterion and the Kaiser-Meyer-Olkin Bartlett's test was used to test for Factor Analysis separately. Once the reliability of the data had been verified, further factor statistical analysis could then take place; this was illustrated by correlation matrix and Total Variance Explained analysis. The Analysis of Fractional Factorial Design was used to test the P value of  $R^2$ .

The first two dimensions, namely; Elaboration and Synthesis and Novelty, adopted from Besemer, it was shown that there was a significant change between all experiments conditions. This change was also observed in the Uninfluenced dimension, developed in this study, in all experiments conditions.

For the Elaboration & Synthesis dimension the P value for  $R^2$  showed statistical significance for all of the experiments at 0.7994 (Table 5-32). For all the variables tested individually, instruction combined engagement and all variables tested together in combination, there a positive impact on creativity indicated by positive coefficient values. The instruction and evaluation in combination and the engagement and evaluation in combination had a negative impact on creativity.

Analysis of the Novelty dimension, the P value for  $R^2$  showed statistical significance for all the experiments where the result was high at 0.9111 (Table 5-32). The table shows that instruction had the most significant negative impact on creativity in children, evidenced by a coefficient value of -33.993, this was followed by engagement at -17.701. The effect of instruction when combined with engagement also had a negative impact on creativity with a coefficient value of -4.493. Finally, there was also a negative impact on creativity where

all variables were tested together, evidenced by a coefficient value of -14.493. However, evaluation alone had positive impact on creativity with a coefficient value of 4.715. The effect of evaluation when combined with instruction or engagement also had a positive impact on creativity with a coefficient value of 13.007 and 5.299 respectively.

The Uninfluenced dimension P value for  $R^2$  showed statistical significance for all of the experiments at 0.8820 (Table 5-32). Instruction had the most negative impact on the signs of influence in the work with a coefficient value of -12.056. A negative impact was also found for engagement and evaluation tested alone with coefficient values of -6.806 and -3.500 respectively. The instruction and engagement combination also had a negative impact on creativity, evidenced by a coefficient value of -0.09722. Where all three variables were combined, there was a negative impact on creativity evidenced by coefficient values of -1.750. For the instruction and evaluation combination and the engagement and evaluation combination there was a positive impact on creativity with coefficient values of 2.042 and 4.764 respectively.

Table 5-32 Multiple Response Regression for All Dimensions

		P value $R^2$	Instruction	Engagement	Evaluation	Instruction & Engagement	Instruction & Evaluation	Engagement & Evaluation	Instruction &Engagement & Evaluation
1	Elaboration & Synthesis	0.7994	13.833	7.833	3.833	0.16667	-2.500	-5.611	1.833
2	Novelty	0.9111	-33.993	-17.701	4.715	-4.493	13.007	5.299	-14.493
3	Uninfluenced	0.8820	-12.056	-6.806	-3.500	-0.09722	2.042	4.764	-1.750

## 5.14 Conclusion

This chapter presented the results of the experiments. Each experiment was addressed individually showing the results of the respective tested variables namely: instruction, engagement and evaluation. The results were expressed according to effect on the three dimensions of creativity, namely: elaboration and synthesis, novelty and influence. The results were shown for different combinations where the variables were tested together, in combination, individually as well as creativity tests where no variables were present.

Where variables were tested individually, overall it was shown that instruction had the greatest negative impact on creativity. This was followed by engagement and evaluation which had similar effects to each other when tested individually. These results were largely attributed to the Novelty dimension. Where the variables were tested in combination instruction was also shown to be significant. Where instruction was combined with engagement, it was found to have the most negative effect on creativity: again, this is attributed to the negative effect on the Novelty dimension. However, when instruction was combined with evaluation, the negative impact on creativity was much less, showing similar results for the engagement / evaluation combination. This would suggest that evaluation has a positive effect on creativity, further evidenced by the results where engagement was tested alone.

Where no variables were included, although there was an overall positive impact on creativity, for Elaboration and Synthesis, there was a negative impact. The positive effect that no variables had on creativity was especially evident for the Novelty dimension where it received a high score in comparison to the combinations of variables, and variables alone.

Reliability of the items used in this study as a part of the Basemer CPSS method was confirmed by reliability analyses which indicated good choices of items in the experiments. The sample size was shown to be adequate and statistically significant through the KMO and Bartlett's test. The influence of all three tested variables was quantified using Fractional Factorial Design which were found from the coefficient values to be correct and statistically significant.

Factor analysis results for all three dimensions of creativity, namely; Elaborations & synthesis, Novelty and Uninfluenced dimensions, indicates that the main underlying factors that give an impact on creativity (principal components which represent items within the dimensions) are just a few, and the first principal components were 34% Elaborations & synthesis, 76% Novelty, 77% Uninfluenced, of total variance. This is in good agreement with multiple response regression which indicates that the first control variable, instruction, contributes approximately 50% to the variance of all dimensions.

With the help of the Fractional Factorial Design, conducted in the experiments, the influence of all three variables were ranked/quantified. The coefficient values show correctness because they were found to be statistically significant indicated by the P value, which was less than 0.05. The “instruction” variable indicates that the highest negative impact on Novelty dimension with the impact coefficient value of 34, and contributes to 55% of total variance, as ANOVA method showed. The “Elaboration & Synthesis” dimension indicated a positive influence by “instruction” variable with a coefficient value of 14 and contributes to 50% of variance. The “Uninfluenced” dimension indicated a negative impact from this variable, which contributes 55% of dispersion.

The overall result of multiple plot analysis here supports graphically that there is an interaction between “engagement” and “evaluation”, which indicates that they have a strong effect on each other. There is a weaker effect found between “instruction” and “evaluation”. Where instruction and engagement are tested together, the plot lines for each are parallel to each other, which indicates that these variables do not have an effect on each other.

# 6 DISCUSSION & CONCLUSION CHAPTER SEVEN

## CONTENTS

6.1	INTRODUCTION.....	162
6.2	DISCUSSION.....	162
6.3	OUTCOMES.....	175
6.4	CONTRIBUTIONS AND IMPLICATIONS.....	177
6.5	CONCLUSION.....	178
6.6	LIMITATIONS OF STUDY .....	180
6.7	RECOMMENDATION FOR FUTURE STUDY.....	180

## TABLE

TABLE 6-1 ADAPTED FROM THE IBF PARTICIPATORY CONTINUUM MODEL (READ ET AL., 2002)	163
TABLE 6-2 ADAPTED FROM THE IBF PARTICIPATORY CONTINUUM MODEL (READ ET AL., 2002)	177

## **6.1 Introduction**

This chapter presents the discussion, outcomes, contributions, conclusions and limitations of the study. The chapter will discuss the findings of the primary and secondary research, the associated outcomes and the implications they have in terms of contribution to knowledge and practice, especially in the area of curriculum development. Moreover, it presents the conclusions, limitations and recommendations of the study. Specifically, the conclusion includes confirmation that the aims of the study were achieved and acknowledges the limitations of the study. Based on the findings of the study, recommendations for how the study can be extended in future study are given.

## **6.2 Discussion**

The approach of the discussion chapter is to firstly discuss the findings of the secondary research, followed by a discussion of the results of the primary research. These discussions then culminate in the overall outcomes of the study.

### **6.2.1 Influence of Adult Involvement**

Because of the nature of this study, the literature review involved a number of different areas, such as psychology and the imagination, art and pedagogy as well as literature related to participatory design and children. The literature showed that adults are often involved with children when they are engaged in creative activity and highlighted the extent of this involvement (Read et al., 2002, Gardner, 1990, Burkitt et al., 2010, Roth, 1996, Einarsdottir et al., 2009, Rose et al., 2006); and that such involvement has been shown to have influence on art outcomes (Rose et al., 2006, Einarsdottir et al., 2009, Gardner 1990).

The literature review demonstrated that there was considerable adult involvement in children's creativity in previous studies and established that there was a case for removing this influence (Read et al., 2002, Gardner, 1990, Burkitt et al., 2010, Roth, 1996, Einarsdottir et al., 2009, Rose et al., 2006). Moreover, the review of the literature revealed that this influence had a significant effect on art outcomes and that children were capable of producing art that was more reflective of their imaginations if they were not influenced by adults (Rose et al., 2006, Einarsdottir et al., 2009, Gardner 1990 McArdle, 2002, Cassou, 2004, Jackson, 2009, Viola, 1942, Cizek, 1936, Dubuffet).

The review showed that there are many different approaches in participatory design and it highlighted their limitations in terms of significant adult involvement and influence. This was even the case for those approaches, which acknowledged the importance of allowing children to be free and independent when they

are engaged in art. The present study had important implications for consideration of participatory design because firstly, it showed the negative aspects of participatory design in terms of influence on children's work, and secondly, it demonstrated the possibility for leaving the participatory design continuum towards a new independent approach where the adult is not required. This was evidenced by the results of the research that showed that aspects of participation had a negative effect on creativity Table 6-1.

*Table 6-1 Adapted from the IBF Participatory Continuum Model (Read et al., 2002)*

INFORMANT APPROACH	BALANCED APPROACH	FACILITATED APPROACH	<b>LEAVE PARTICIPATORY APPROACH</b>	INDEPENDENT APPROACH
Child informs the designer about what he or she wants (directly or indirectly)	Equal participation of adult and child in design and production	Child creates and realises the design and adult is a facilitator		<b>Child creates and realises art with minimal adult involvement</b>

The very idea that where children are engaged with adults during the creative process there is an influence on creativity motivated the study. These ideas lead to the development of the main hypotheses of the study; H1 and H2. H1 stated '*Teacher involvement is an influence that has an effect on the creativity of children's art*', and in relation to the idea that the literature showed a case for removing adult influence, H2 stated the following: '*The absence of teacher involvement leads to an increase in creativity*' These hypotheses formed the basis of the primary research.

Another idea that arose in the secondary research was that children were capable of their own art that was pure and not influenced by adults. This idea was tested in the primary research through considering aspects of drawing outcomes that show signs that they are not influenced.

Because the secondary research revealed that there were different aspects of participation with the child during the creative process, it informed the necessary aspects of participation that needed to be considered in the primary research, the experiments. These included the different ways that adults engage with children in the creative process. This was in addition to primary research methods, which included observation, interviews and questionnaires, that also informed about these aspects for the development of the experiment. Moreover, the design of the other primary research methods, for example, observation, which were intended to find out more about aspects of participation in the classroom, in the specific research area of this study, were also informed by the results of the secondary research.



## 6.2.2 Creativity

The study accepted definitions of creativity from the secondary research that included creativity to be about involving the imagination, originality of ideas and the ability to produce an outcome of value (Sharp, 2004), novelty, original forms and an unusual perspective (Garaigordobil, 2006). Almeida et al. (2008) say that creativity includes an open mind, novelty, originality and elaboration. Although cognitive theories emphasise intellectual processes which lead to original ideas as an indication of creative potential, cognition is difficult for researchers to pin down and therefore, researchers have to depend on non-cognitive factors such as social factors considered in creative production (Runco, 2003). Furthermore, the issue of influence on creative ability has been understood as creative development being influenced by the environment.

The secondary research also showed that creativity is something that is supported by the teacher in the classroom through teacher attitudes and action, offering suggestions, criticism and evaluation (Runco, 2014) and through motivation (Tighe, Picariello and Amabile, 2003). These aspects of teacher involvement as factors of influence on creativity and the aforementioned attributes of creativity are tested by the primary research of this study in a specific setting.

Therefore, the study was based on the premise, expressed as hypotheses, that aspects of teacher involvement in the art classroom have an influence on creativity. Specifically, this was based on the ideas in the literature that generally there is a negative influence on creativity (Read et al., 2002, Gardner, 1990, Druin, 2002, Pavlou, 2006) and this study sought to investigate this. Therefore, in addition to ideas about creativity which include aspects such as originality and novelty, signs of influence as a measure of creativity was also included in the study. Specifically, these aspects of influence included signs of the work being influenced as opposed to being pure, being restricted as opposed to being free and being directed as opposed to being undirected, all as evidence of negative influence on creativity.

It was therefore necessary using primary research to measure the effect of involvement of the teacher on creativity through measuring the aforementioned attributes of creativity in children's work. This was achieved through the application of CPSS which was an instrument for measuring attributes of creativity identified in the secondary research, such as novelty and elaboration. However, because the study was primarily concerned with the issue of influence and its potential negative impact on creativity, it was necessary to adapt CPSS to include measurement of signs of influence as negative influences on creativity.

The study wanted to find out how creativity in children was affected in the classroom, specifically, how creativity was affected by the involvement of the teacher. Primary and secondary research revealed that there were three main ways, instruction, engagement and evaluation, that the teacher was involved with children

during the art class and that they were directly related to the structure of the class. In the design of the experiments it was important to emulate these types of involvement to include aspects that would be found in the real class situation, for example, engagement in practice had to include discussion and encouragement. These potential influencers of creativity were tested in isolation, in combination and all at the same time in order to gain a greater insight.

### **6.2.2.1 INSTRUCTION**

In the literature, although there is support for allowing children to create freely and spontaneously and the idea of pure art (Rose et al., 2006, Einarsdottir et al., 2009, Gardner 1990, McArdle 2002, Cassou 2004, Jackson 2009, Viola 1942, Cizek 1936, Dubuffet 2003, Drew and Rankin, 2004), there is little mention of the issue of instruction as an influence. However, there was some support for this idea: Runco (2014) brings attention to the fact that instructions and direction can have a positive effect on the originality aspect of creativity. Specifically, Runco (2007) says that if instructions are worded in a certain way they can increase creativity and make room for originality, if instructions are open-ended they provide an opportunity for creative thinking. This was found to be the case in the present study where the absence of instruction, whereby an open-ended task was given in the form of the statement '*draw whatever you want*', a positive effect on creativity was found. In contrast, Runco (2007 p.199) brings attention to conceptual instructions, for example '*here is the kind of idea or solution you should attempt to find*' and the curriculum analysis in the present study showed that instructions were restrictive in this way, which the results of the experiments showed to have a negative impact on creativity, especially the Novelty aspect of creativity which is reflective of originality. Therefore, the results of the present study concur with Runco (2007) in this sense.

This idea of a lack of instruction for increasing creativity is supported by Franz Cizek (1936) who said that towards achieving creativity the only involvement from the teacher should be the provision of materials and a creative environment. However, the literature does not suggest that instruction is necessarily a negative form of influence on creativity. Rose et al. (2006) say that children desire support from adults in the form of instruction because they value realistic drawings.

Therefore, because instruction was found, through the secondary research, to be an integral part of the art class, to have both positive and negative effects on creativity, and it was the responsibility of the teacher to deliver instructions, it was necessary to test the effect of instruction on creativity.

Instruction was found in the primary research to be informed by the curriculum. Specifically, the Teacher's Workbook supplied by the Saudi education authority included the practical steps that the teachers tell the children to follow. Moreover, the interviews showed that teachers felt that their role was important in terms

of their instruction having a positive effect on creativity. The observation of the class also affirmed instruction as a significant part of the class procedure.

As a primary research method, the experiments were designed to test the effect of the different identified aspects of teacher involvement on the various attributes of creativity. Instruction as an aspect of teacher involvement was tested in the experiments to determine its effect on creativity. Instruction was tested alone as well as being tested for its absence. The instructions that are given in the normal classroom situation, as usually informed by the curriculum, were also given in the experiments. The effect of instruction on the various aspects of creativity was tested using CPSS.

Instruction was found through both primary and secondary research to be a significant aspect of teacher involvement. The overall finding here is that instruction does have an effect on creativity because it specifically has an significant effect on the Novelty aspect of creativity.

Although there was an indication by the teachers that instruction in the classroom made the aim of the session clearer because children were shown examples, and that this is something encouraged by the curriculum, the results showed that instruction had a negative effect on children's creativity. Where the teacher gave instructions to the children this had the greatest impact on creativity in comparison to the other two variables of engagement and evaluation. Specifically, this was because instruction had a stronger negative impact on the Novelty aspect of creativity which affected the negative impact on creativity overall. Instruction had a much lesser impact on the Elaboration and Synthesis components of creativity. Novelty is a dimension that reflects originality of the work and the analysis of the curriculum clearly showed that instruction involved providing examples and telling the children what is expected of them according to established criteria which could limit what they would want to produce.

Continuing with the fact that the results show that instruction had the most significant impact on creativity, specifically, the novelty component of creativity, the effect of instruction when combined with other variables also had a negative impact on creativity. Where instruction was combined with engagement, it had the greatest negative impact on creativity (overall 42 percent creativity) compared with instruction alone. This was in contrast to where instruction is combined with evaluation, where the negative impact was significantly less (overall 54 percent creativity) and again Novelty was the determining factor of the creativity score.

The results show that the overall score for creativity is largely determined by Novelty where instruction is being tested and that Novelty is an aspect of creativity that is negatively affected by the presence of instruction.

However, the effect that instruction has on creativity, specifically the Novelty aspect, is mitigated by evaluation. This was evidenced by the fact that where instruction is combined with evaluation, the score for Novelty was double than when instruction was combined with engagement (30 percent and 60 percent respectively), and where instruction is tested alone the score for Novelty was 40 percent. Therefore, it is important to look at the effect of evaluation in isolation. The score for Novelty where evaluation was tested alone was significantly high at 61 percent, which explains the mitigating effect that evaluation has on the effect of instruction.

Further evidence that instruction has a particular effect on the Novelty aspect of creativity is that the effect that instruction had on Elaboration and Synthesis was minimal where the variation was not significant.

Where the results show that instruction has a negative effect on creativity, this confirms ideas by Roth (1996) that instruction in the form of demonstration and hints influences the child, and Runco (2014), who says that instruction has a significant impact on creativity. Where the results show that no instruction has a positive effect on creativity, this supports the idea by Runco (2014) who supports open-ended instruction. The present study has shown that such expectations by adults in the form of instruction impedes creativity in children, thus showing that adult expectation manifested through instruction is a significant influence on children to the detriment of creativity.

Moreover, this study offers the possibility to step away from adult expectation, often derived from curricula, and the associated need for instruction towards achieving a more child-centric creativity.

#### **6.2.2.2 ENGAGEMENT**

The secondary research has provided much evidence that where the adult or teacher is engaged with the child, there are effects on creativity, both positive and negative. Evidence of a general influence on creativity has been suggested by Einarsdottir et al. (2009), who say that provisions, interactions and support from adults influence children's drawings, while Gardner (1990 p.ix) said that classroom learning has an influence on the style of the art. It has been suggested by Runco (2007) that the involvement of teachers during the creative process can change attitudes in children which may promote or inhibit creativity. Children get help from teachers in the form of verbal suggestions, advice and tips (Burkitt et al., 2010, Roth, 1996). In support of ideas that teacher engagement in the creative process has an effect on creativity, was the idea that an absence or significant reduction in teacher engagement would help creativity (Craft et al., 2014).

Engagement was an important variable in this study because it represented where the teacher is engaged with the child the most during the creative process. Engagement included giving suggestions, providing feedback

and offering encouragement, which were determined to be parts of overall engagement through the primary and secondary research of the study.

Primary research was carried out in the form of questionnaires, interviews and observation in order to determine the various aspects of engagement with children in the class. The questionnaires revealed that teachers felt their role was necessary in involvement in the creative process and that children depended on them through asking questions. In relation to this idea, Read et al. (2002) said that in participatory design children tend to demur to adults even where they feel they know more about the subject and Rose et al. (2006) who say that although children have confidence in their drawing ability, they still need support from adults. The opinion of the teachers that they are necessary in the process reflects the criticism that is made by Druin (2002 p.1, 2) that although children have their own tastes, which are different from teachers, children are still dependent on the 'all-knowing' adult. However, in agreement with the opinion of the teachers, Wilson and Wilson (2009) say that the teachers are needed for artistic creative development. Moreover, the importance that teachers assigned to their role was further affirmed by the fact that teachers felt that leaving children alone would not lead to increased creativity and that ability has to be developed. Again, this was the idea of Wilson and Wilson (2009) who were against a hands-off approach. However, there are those who would be against these opinions of the teachers, such as Jackson (2009 p.259) that children have their own '*capacity for infinite acts of creativity*'.

These primary research methods revealed different aspects of teacher engagement which included offering opinion, encouragement, discussion, monitoring, feedback and making suggestions.

As a potential influencer on creativity, engagement was measured for its impact on creativity and the individual dimensions of creativity using CPSS. Again, engagement was tested alone, in combination with other involvement variables and in absence. The teacher was requested to engage the children in the normal way that they would in the normal classroom situation where engagement was being tested.

The primary and secondary research carried out prior to the experimentation revealed that engagement had both positive and negative effects on creativity and it was the opinion of the teachers that it was a requirement to help children be creative. There was little support in the literature that suggested that there was a negative influence, only that there was an influence. The results of the experiment in this study showed that engagement did not have much significant negative impact on overall creativity and received a similar score to evaluation. Moreover, this low impact on creativity was found to be true for all of the individual components of creativity, unlike instruction where there was a focussed impact on Novelty.

Engagement was found to have a very similar effect on the Elaboration and Synthesis aspect of creativity as the instruction and evaluation variables and they returned scores of 43 percent, 45 percent and 42 percent respectively. The same was true for the Uninfluenced aspect of creativity where the scores were 39 percent, 34 percent and 41 percent respectively. Moreover, because both engagement and evaluation had similar positive effects on Novelty, which were less than instruction, therefore, the results for engagement further show that instruction as a variable had the most negative impact on creativity because of its impact on Novelty.

In comparison to the control experiment where all three variables were included, engagement alone had a negative effect on the Elaboration and Synthesis, but a positive effect on both Novelty and Uninfluenced. Where engagement is shown to have a significant impact on the aspects of creativity is in comparison to the control experiment where no variables were included. For Novelty and Uninfluenced, engagement alone had a significant negative impact, however, engagement had less negative impact on Elaboration and Synthesis than the experiment where no variables are included. Therefore, it is indicated that engagement alone has a slightly positive effect on the Elaboration and Synthesis aspect of creativity.

This may suggest that engagement or certain elements of engagement either do not have a significant negative impact on creativity or they do, to a certain extent, have a positive effect on creativity in children. Both ideas, a positive effect on creativity and a negative effect on creativity of engagement can be found in the literature. Runco (2007) says that teachers can support children's creative talents in a number of ways which include discussing alternatives, supporting the ego-strength of the child or providing ability-related feedback. It is important to note that the engagement with the child is where the teacher is most involved and this takes place while the child is being creative so it would be expected that engagement would have some influence one way or another. The literature certainly agrees with the idea that teachers can support creativity through their actions and activities which include offering alternative suggestions and even criticisms (Runco, 2014) or where the child is inspired by teachers and that the attitude of teachers and their perception can also have an effect on creativity (Tighe, Picariello and Amabile, 2003). However, it may be the case that the attitudes and practices of the teachers have a negative effect on creativity (Tighe, Picariello and Amabile, 2003). This may be through constraints on creativity such as not allowing the child to verbally express their aspirations (Tighe, Picariello and Amabile, 2003) or the use of 'squelchers' such as '*can't be done*' which inhibit creativity (Runco, 2014 p.183), or through feedback and suggestion not allowing children to be creative beyond the parameters of the brief.

### 6.2.2.3 EVALUATION

The evaluation variable was included to see the effect on creativity when children know that they are going to be evaluated. The children were simply told that their work would be evaluated at the end of the experiment. Overall it was shown that the evaluation variable did not have a significant negative impact on creativity in comparison to the other variables. However, where there was a more noticeable negative effect on creativity from evaluation was for the Elaboration and Synthesis component of creativity, however, this was only marginal.

In comparison to the experiment where there is an absence of all variables, evaluation was shown to have very similar effects on creativity to the engagement variable. Specifically, this means that evaluation was also found to have a positive effect on the Elaboration and Synthesis aspect of creativity as was the case with engagement.

The study has shown that all three variables tested alone and all three possible combinations of two variables, as well as all three variables in combination have a positive effect on the Elaboration and Synthesis aspect of creativity. This finding was further supported by the finding that where there were no variables present there was a significant comparative decrease in the Elaboration and Synthesis aspect of creativity. This means that the influence variables have an overall positive effect on Elaboration and Synthesis. Where there is an overall negative impact on creativity from all variables was due to the scores for Novelty and Uninfluenced, and it was found that the Uninfluenced dimension had the greater negative impact.

In reference to the hypotheses of the study, H1 states that teacher involvement is an influence that has an effect on the creativity of children's art. This has been shown to be the case, where both positive and negative influences were identified. H2 states that the absence of teacher involvement leads to an increase in creativity, and while this has been shown to be true for overall creativity, it has not been the case for the individual aspects of creativity where the involvement of teachers has been shown to increase creativity, especially for the Elaboration and Influenced aspect. H3 states that the curriculum can have an indirect effect on creativity in children. Because the instruction variable that was tested was derived from an analysis of the curriculum and that this variable was shown to have an overall negative impact on creativity, therefore, there is an indirect link between the curriculum and creativity in children and therefore, H3 is substantiated. Finally, H4 states that some influencing factors have a greater impact on creativity than others. Again this was also found to be true, especially in the case of instruction, shown to have a negative impact on the Novelty aspect of creativity, and evaluation and engagement having a positive impact on the Elaboration and Synthesis aspect of creativity.

Based on the idea of pure art where work that is not done with the involvement of adults shows less signs of influence, evidenced from the literature (Rose et al., 2006, Einarsdottir et al., 2009, Gardner 1990 McArdle, 2002, Cassou, 2004, Jackson, 2009, Viola, 1942, Cizek, 1936, Dubuffet), this study included the ‘Uninfluenced’ aspect of creativity in CPSS. This study was interested in finding out the effect on signs of influence in the children’s work of specific aspects of involvement. Therefore, the study expands on previous studies whereby in this study individual aspects of creativity are considered in isolation, together and in various combinations. This reveals not only the impact on creativity of these individual aspects, but also the overall impact on creativity that can be found in the classroom situation.

### **6.2.3 Pure and Influenced Drawings**

One of the motivations for the study was that children, when left alone without adult involvement, are capable of producing ‘pure’ art. This idea has been put forward by Pablo Picasso 1976 who famously said “*It took me four years to paint like Raphael, but a lifetime to paint like a child*” and “*Every child is an artist. The problem is how to remain an artist once he grows up*”. Furthermore, the artist Jean Dubuffet said that children produce raw art and that this art is not tainted by social constructs unlike work by adults, which is influenced by rules and expectation.

The idea of pure art and the ways that it is achieved was very important in justifying, motivating and informing the investigation of the study. This study has shown that has been written about the merits of pure art that comes from the imagination of the child (McArdle 2002, Cassou 2004, Jackson 2009, Viola 1942, Cizek 1936, Dubuffet 2003).

Although the literature has revealed that much has been written about pure art and that whatever a child produces is valuable, the review also served to highlight the gap in the research, specifically, that not much had been written about achieving pure art in school and the development of curricula that can help to achieve increased child creativity.

Overall, it was shown that removing the involvement of an adult led to the creation of drawings that showed signs of purity or less signs of influence. This was achieved through the measurement of influence using the adapted CPSS which included the dimension ‘uninfluenced’ with a ‘pure’ subscale. CPSS was a tool that was used to judge the work for signs or lack of signs of influence, which relate to the purity aspect of the drawings, and to judge originality, which is related to imaginative aspect of the drawing. This was based on the idea that work that shows less signs of influence is more reflective of the purity of the drawing by the child.



Instruction had the greatest impact on the signs of influence in the work, whereby the score for the work being ‘uninfluenced’ was low: this was true for instruction alone and when in combination with another variable. Specifically, all of the variables of adult involvement when tested alone had effected a significant decrease in the Uninfluenced dimension, in comparison to the experiment where there were no variables included. Moreover, there was an even greater negative impact on the Uninfluenced aspect of creativity where all of the variables are combined. Where there were combinations of two variables, instruction combined with engagement had the greatest negative impact on Uninfluenced aspect of creativity, where evaluation was combined with engagement and no instruction was present, this had the least negative impact on the Uninfluenced aspect of creativity. Therefore, where instruction is present, it results in signs of influence in the work (Rose et al., 2006, Einarsdottir et al., 2009, Gardner 1990).

#### **6.2.4 Role of the Teacher**

The third hypothesis of the study (H3) states that ‘*Some aspects of teacher involvement are more significant influencing factors in the impact on creativity than others*’. Mostly when children are engaged in drawing or being creative they are in a school setting: therefore, it was important to consider the issue of the role of the teacher in this study as influence on creativity in children. Specifically, the study was able to find out, through the questionnaire, the literature (Burkitt et al., 2010, Roth, 1996, Einarsdottir et al., 2009, Rose et al., 2006) and a review of the curriculum how teachers engaged children in the classroom, whether through instruction, approval or judgement, encouragement, providing feedback, advice, monitoring, discussion and setting exercises.

The study revealed that teachers placed a great deal of importance on their role, and while there is nothing wrong with this, it revealed the extent of adult involvement and also the idea that teachers feel that children need them in order to be creative. All teachers felt their involvement in the drawing process was necessary and that they believe that all forms of their involvement have a positive effect on the child’s creativity based on the results of the primary research. However, the results here suggest otherwise, where instruction and engagement had negative effects, evaluation was shown to have positive effects. Burkitt et al. (2010) agrees that if constructive comments from teachers are channelled in the right way this will empower children to develop the techniques they already have. Roth (1996) recognises the different form that teacher influence can take and Einarsdottir et al. (2009) say that provisions, interactions and support from adults influence drawings. This is in contrast to the literature that has shown that teacher involvement has a specifically negative effect on creativity (Read et al., 2002, Gardner, 1990, Druin, 2002, Pavlou, 2006).

The results of this study have served to highlight the different aspects of the teacher's role and that they may not have been aware that there are certain aspects of their role that have had an impact on creativity. For example, evaluation was shown to have a more positive effect on Novelty and a negative effect on Elaboration and Synthesis, and instruction was found to have a more negative on Novelty and overall creativity. However, it is important to note that this was found for a particular national and cultural context. Therefore, this study has revealed the idea that teachers should reconsider certain aspects of their role towards achieving a positive impact on creativity.

Therefore, although teachers can be supporters, coaches, facilitators and models of creativity for children (Sharp, 2001), they can also impede opportunities for creativity by being prescriptive or too didactic (Tegano et al., 1991; Malaguzzi, 1993), through removing fantasy and by having limited expectations about children's creative ability (Prentice, 2000; Torrance find in Mellou, 1996).

There may be those who argue that teachers are necessary at the very least to facilitate the design and production process, and while this may be true, it is the extent of that facilitation that this study has put into question. The evidence for this idea comes partly from participatory theory which shows that different types of involvement have varying degrees of influence. Therefore, there needs to be a balance between the role of the teacher as being controlling and an impediment to child creativity and the role of the teacher being a cultivator of creativity. The latter point is supported by Thomas (2010) who suggests that the teacher should use social tact to bolster creativity and Hofmann (1998) who say that the teacher and the child should share the same starting point in order for the child to develop their innate abilities.

Each of these ideas has implications for the role of the teacher, for example, to reduce the role of the teacher in terms of encouragement, discussion and feedback, and instructions; and to reduce the value of the teachers opinion, in the form of evaluation, because it has been shown in this study to have a negative influence on creativity.

### **6.2.5 Curriculum**

The fourth hypothesis of the study (H4) '*Curriculum can have an indirect effect on creativity in children*'. Part of determining the variables for the experiment involved analysis of the curriculum because how teachers engage with children in the class is largely informed by the curriculum. Therefore, because it was shown that teacher involvement did have an impact on creativity, the curriculum has an indirect impact on creativity.

Primary teachers are concerned that curricula are overcrowded which has reduced their scope for creative work (Her Majesty's Inspectorate of Education, 2006). Teachers argue that more flexibility in national advice would permit them to spark pupils' imaginations in more effective ways, through focusing on new teaching and learning approaches (Her Majesty's Inspectorate of Education, 2006).

In reference to the design of a curriculum, this study has shown the need for designing an art curriculum where children have the opportunity to be creative with less adult influence, demonstrated by the results of this study.

The study is significant for those who are involved in the design of curricula, whereby they can consider the appropriateness of including the principles of an absolute minimal involvement in art or even the principles of reduced or removed influence in other areas of the curriculum where children are engaged in drawing. Presently, those who are involved in the development of curricula assign much importance to the development of skills, experience with materials and the development of creativity (Burkitt et al., 2010). As the results of the present study show, the majority of teachers agree with the idea that the requirements and standards within the curriculum can best assess creativity as evidenced by the primary research. These principles are contrary to the principles that creativity is something spontaneous, from the self, cannot be taught and in children should not be influenced by adults. This idea is supported by Runco (2007) who says that although convergent thinking as encouraged by curricula is suitable for improving problem solving, with a divergent thinking approach there is more creativity. Therefore, Runco (2007) says there is a need for educators to look at their curricula to see how much is open-ended towards a divergent approach. Therefore, this study offers a new paradigm whereby children are creative independent from adults leaving the participatory design continuum, this can be considered in the future development of curricula for children. Currently, teachers are restricted by the curriculum and have to work within curriculum guidelines (Pavlou, 2009), which dictate lesson design, subjects, methods and materials as well as criteria for assessment. For the curriculum in the present study it was found that instruction and how the teacher engaged the children was restrictive, and the results of the experiment showed that they negatively impacted creativity. This study supports the idea that children can be freer of these restrictions within an education setting.

Another implication for the design of the curricula is that the results of this study show the influence on creativity of the different aspects of teacher involvement and that such involvement can have a negative effect on creativity. Specifically, where instruction was tested the instructions to the children included illustrated examples of what they had to draw, for example in experiment 2 children were shown a picture of a mosque and the resulting drawings by children were similar (see appendix, Experiment 2). This was evidenced in a decrease in the uninfluenced and novelty aspects of the children's drawing in this case. This

therefore has implications for the design of curricula in terms of these different aspects of involvement which represent the different components of the art class with children.

### **6.3 Outcomes**

In reference to creativity and the effect that the tested types of teacher involvement had on creativity, the overall outcomes of this study show that different types of involvement have varying effects, both positive and negative. This was evidenced by the results that showed that, for example, instruction as well as instruction in combination with engagement had a negative influence on the novelty aspect of creativity. However, instruction combined with evaluation showed less negative effect on creativity because evaluation mitigated the negative effect and where evaluation was tested alone it had a positive effect on overall creativity. Moreover, between a strong negative impact on creativity and a positive effect on creativity, engagement was found to have not much negative effect on creativity (for engagement overall creativity was 50 percent). Therefore, various aspects of teacher involvement were shown to have varying effects on creativity, both positive and negative.

Moreover, the results also showed that the different aspects of creativity, which included novelty, elaboration and synthesis and uninfluenced were affected in different ways by the involvement variables. An example of this was instruction which had a specific negative effect on the novelty aspect of creativity and evaluation which had a positive effect on the novelty aspect of creativity as well as a positive effect on elaboration and synthesis. Further evidence of the effect on creativity was the level of purity found in the drawings where the different aspects of teacher involvement had differing effects.

The results have shown the role of the teacher to be significant in terms of the perception of the role by teachers themselves, and how their role is informed by the curriculum. The different aspects of the role of the teachers has been highlighted by the study and shown to have both negative and positive impacts on creativity. Specifically, instruction was shown to have a negative impact on creativity, more so than engagement and evaluation in the context of the school system in Saudi Arabia and the associated curriculum which was found to be prescriptive. The study has also shown, through analysis of the curriculum, how the role of the teacher is informed by the curriculum, and therefore, how the curriculum has an indirect effect on creativity.

The study has shown that the teachers have different roles which can be found in the structure and requirements for the class procedure informed by the curriculum. Specifically, the teacher is the one who instructs, encourages, motivates, provides feedback and evaluates, all of which, within the three identified variables, have been shown to affect creativity.

In reference to the hypotheses of the study, the outcomes in relation to the role of the teacher have also served to validate H1 which states that teacher involvement is an influence that has an effect on creativity, evidenced by the fact that the role of the teacher has both negative and positive impacts on creativity, and H4 which states that the curriculum can have an indirect impact on creativity, evidenced by the finding that the curriculum informs the role of the teacher.


The curriculum was shown to inform how the teacher conducts each part of the class, and each part of the class was determined as an experiment variable. Specifically, in reference to instruction, in this case, the curriculum provided the teachers with the instructions that they had to give for a particular class exercise and given that instruction was found to have the strongest negative impact on creativity, the curriculum had an indirect negative effect on creativity.

The need to have a curriculum to inform teachers about their pedagogical approach is therefore, brought into question. Although where all forms of teacher involvement as variables informed by the curriculum are removed, there is an increase in creativity, this does not mean that the curriculum is a negative influence generally on creativity, as evidenced by the fact that there are forms of teacher involvement informed by the curriculum that were shown to have a positive effect on creativity.

The study found that where children engaged in artistic creativity independently from adults, where children moved beyond the confines of participatory design, there was an increase in creativity. The study found through secondary research that although there were varying degrees of involvement by adults, which included mere facilitation, the child only being an informant, instruction, suggestion and judgement, adults always had some significant level of influence. The primary research also revealed the influence on creativity from the different aspects of the teachers' role. Moreover, because experiments took place where there was no involvement from the teacher, which showed an increase in creativity, it shows that there is justification for an approach to creativity that leaves altogether the participatory design continuum to a new independent approach (Table 6-2). These ideas, therefore, could lead to a new design paradigm where work by children show less immediate influence from adults. Although the results of the study do justify a need to remove some of the aspects of involvement and influence of the adult because associated increases and decreases in creativity have been shown, there is also a need to reconsider approaches to participatory design because some aspects of adult involvement have been shown to have a positive effect on creativity.

Table 6-2 Adapted from the IBF Participatory Continuum Model (Read et al., 2002)

INFORMANT APPROACH	BALANCED APPROACH	FACILITATED APPROACH		INDEPENDENT APPROACH
Child informs the designer about what he or she wants (directly or indirectly)	Equal participation of adult and child in design and production	Child creates and realises the design and adult is a facilitator	<b>LEAVE PARTICIPATORY APPROACH</b>	<b>Child creates and realises art with minimal adult involvement</b>



0 %      Percentage contribution and realisation of design by the child      100%

## 6.4 Contributions and Implications

The main contribution of the study is that it has contributed to understanding how the different aspects of teacher involvement have an effect on creativity in children. In reference to the idea that says that certain types of involvement by teachers can influence creativity, this study has served to not only have contributed to knowledge in this area but also to further clarify the effect of this phenomenon and show that teachers can have detrimental effects on creativity.

The different ways that teachers interact with children was, to a certain extent, identified to be informed by the curriculum. Therefore, the study has implications for how the curriculum is a contributing factor to the impediment of creativity. This is an indication that a considerable rethink of the design and development of art curricula is required.

In the future where curricula and approaches to participatory design are better developed to consider the types of involvement by teachers and therefore, result in an increase in creativity, this will contribute to a new approach by children and a new paradigm which is more reflective of children's imaginations and their ability to be creative. Moreover, this study will contribute to a rethink about the idea of creativity in children.

An additional significant contribution of the study is that it provided a new way of judging creativity, which was based on a need to overcome the limitations of the existing method of CPSS. These limitations were that CPSS firstly, included a dimension, Resolution, that was not relevant to measuring the type of creativity intended by this study, and secondly, it did not include a way of measuring, and therefore, identifying influence of adults which the study aimed to achieve. It is important to note that this new approach to judging creativity was based on the idea that there is influence on children's creativity, and therefore, it was important

to reveal any signs of this influence. This specific approach of including the uninfluenced dimension was based on the idea that the influence of adults could potentially have a negative effect on art outcomes where such influence would be evident in children's work, based on ideas in the literature such as Franz Cizek. Moreover, work that showed less signs of influence would be purer and therefore, a new paradigm would be achieved. This adapted CPSS can be used by those who are interested in measuring creativity of children in a setting where adults are involved.

## **6.5 Conclusion**

In conclusion, this study was based on examining the idea that the involvement of teachers when children are drawing is an influencing factor on the children's creativity. The study showed that the different types of involvement which included instruction, engagement and evaluation were found, to varying degrees, to have an effect on the child's creativity and that removing any or all of these influences would lead to a change in creativity generally, although for the Elaboration and Synthesis aspect of creativity the opposite was true.

The study set out to analyse the potential effects that certain influences have on the creativity of children in the classroom. This was based on the premise, identified in the literature, that certain influences, specifically in this case types of involvement of teachers, have an effect on the creativity in children. The investigation of these possible influences was achieved through the identification and testing of approaches and aspects of pedagogy. Specifically, the application of certain aspects of pedagogy including instruction, engagement with children and evaluation of the art produced by children, were investigated all together, in various combinations and alone in order to determine the associated impacts on creativity.

The study was important because it sought to address an issue which was that creativity is thought to be impeded by the influences of pedagogy and that there was a real need to investigate this while at the same time revealing a new design paradigm from children as well as the practical ways this can be achieved.

Before the investigation was carried out there was a need to establish the current situation as regards children engaged in art and current approaches in the art class. This included consideration of the effect of the curriculum on pedagogical approaches, including how teachers instruct children; how they engage them in the creative process; and how they evaluate their work.

In regards to the curriculum, it was found that it had a significant impact on art activities whereby the skills that are taught and the measure of their success, as well as the importance that the teacher assign themselves in these processes, were dictated by curriculum, and therefore, this was considered an indirect contributing impediment to creativity in children.

As regard the teachers, towards the objective of assessing the role of the teacher in order to understand how they engage with children during the artistic process and the associated involvement and influence, the study found that teachers had numerous roles. These roles included instruction, monitoring, encouraging, discussing and judging. The results showed that teachers felt that their involvement was important and they are more involved in facilitation rather than creativity. Primarily it was important to test if these various aspects of teacher involvement, which are found in all aspects of the process, had an impact on creativity as the literature suggests there can be both positive and negative impacts from such involvement.

Understanding how instruction, engagement with children and assessment took place was essential in designing these aspects into the experiments, to test their influence on creativity.

The evaluation of this approach was achieved through CPSS as a recognised judgement method for assessing creativity in drawings, to make comparisons between drawings produced under the different experimental conditions, i.e. with the inclusion and exclusion of different types of adult involvement.

Furthermore, evaluation of drawings produced, with the inclusion and exclusion of various types of adult involvement, was carried out to investigate the impact these factors have on the creativity of children. This was achieved through statistical methods, specifically reliability, factor analysis and analysis of fractional factorial design. The study was able to successfully employ and modify CPSS by introducing a new dimension that measured signs of influence in addition to the existing dimensions of CPSS that measured creativity. In order to validate the reliability of the CPSS method including all of the dimensions, the reliability method by Besemer (the method's creator) was employed and showed the adapted method to be reliable. Based on these reliability results, the factor structure of the creativity and influence dimensions was compared between all experiments. All data was found to be reliable.

Thus, it is clear that the study achieved its aims, which was to investigate the effects of aspects of teacher involvement on the creativity of children in Saudi Arabia to contribute to knowledge about children's ability to be creative.

The findings can be used to inform the design of curricula and to reconsider the commonly accepted role of the teacher. To achieve this, the study examined the type and level of involvement and teacher influence through a review of the literature including participatory design approaches, and primary research with teachers. The results clearly showed that the role of the teacher had an effect: this was evidenced not only by an increase in creativity as a result of an overall exclusion of the teacher's role, but also differing impacts on creativity through the inclusion and exclusion of certain aspects of the teacher's role where such variables are tested alone and in combination..



Specifically, this research has not only shown there is a need to reconsider the role of the teacher, but has shown that the role itself includes the instruction, suggestion, discussion, encouragement, feedback and judgement aspects and that these factors have been shown to have an effect on creativity. Therefore, the study has identified the role that teachers play when children are being creative in the art classroom and what aspects of this role can be reconsidered in order to reduce the negative impact of these aspects.

## **6.6 Limitations of Study**

Although it has been acknowledged and investigated in this study, there were factors related to the children as participants that have a bearing on the study. The study was set in a specific ethnic and cultural setting and it is reasonable to think that there would be cultural and even religious influences on the creativity in the children which would be reflected in their drawings. Although this was taken into consideration, it was not considered in relation to how this would have an impact on the assessment of creativity using CPSS, although it is important to note that the judges were from the same cultural background which would mitigate this issue to a certain extent. This has implications for the effect that the curriculum in this study has on creativity and the need to compare this effect with other curricula in other parts of the world as a resolution to this limitation.

## **6.7 Recommendation for Future Study**

### **6.7.1 Curriculum**

The study showed how the curriculum was important in informing the involvement of teachers with children when engaged in art, however, the curriculum of this study was in a particular cultural and national setting. Therefore, future study could make a comparison between the impacts on creativity of curricula from different cultural or national contexts. This would involve identifying the different pedagogical approaches that derive from different curricula and making a comparison between them in terms of their impact on creativity.

### **6.7.2 Children's Perception**

The perception of the children was not sought in the present study. A future study could investigate the perception of the experience in the experiments in order to gain a greater insight into the effect of the various types of adult involvement. This could include focus group discussion about how they felt about the finished designs and products and the involvement of teachers. The study is partly based on what children produce is

pure and from their imaginations and a discussion with children could determine if children felt that what they produced was in their imaginations. Therefore, it is proposed that a future study could engage children to find out the extent to which they felt that what they produce was what they had in their mind. Moreover, in relation to this idea, a future study could examine how involvement has an effect on the creative process in terms of tainting the realisation of the imagination of the child.

### **6.7.3 Peer Influence of Other Children**

The study measured creativity scores based on the idea that creativity would be influenced by adult involvement. However, other children that are also in the room engaged in art may also have an effect on creativity. Therefore, a future study could measure the effect that other children have on creativity within the context of participatory design between adults and children.

### **6.7.4 Classroom Layout**

An experiment took place in a normal classroom setting. A future study could consider the effect that the classroom environment has on the creativity in children, this could include the effect of different classroom layouts, or comparisons made between the traditional classroom layout and newly developed classroom layouts designed to improve creativity.

### **6.7.5 Materials**

Materials is a feature of the creative process of children and therefore, a future study could investigate the effect of material on children's creativity. Moreover, the present study has considered the role of the teacher in the classroom and how aspects of that role has an effect on creativity, this approach could be applied to the facilitation of materials by the teacher. More specifically, the choice of materials by the teacher, how they demonstrate how it can be used towards achieving a task or suggestions about the use of materials generally can be investigated in order to determine the influence on creativity.

### **6.7.6 Investigation of the Teacher Role Variables**

This study identified and investigated three variables of involvement from the teacher as potential influence on children. Because the results of the study showed that each of these variables had an effect of creativity in differing ways, a future study could further investigate these variables individually.

It would be expected that within each variable there are further factors to consider, for example within the instruction variable there would be different ways of delivering those instructions that could be investigated for effect on creativity, for example, using examples when giving instructions could be examined specifically. This idea can also include engagement where the individual aspects of this are considered such suggestions and feedback, and also in the evaluation variable where the different approaches to being evaluated can be tested. This would further contribute to the development of approaches to teaching as well as further inform the development of curricula.

The results of the study revealed that the different variables had very different effects on the measures of creativity in the drawings. Specifically, although the results showed that the different types of involvement by the teacher had an effect on overall creativity, it was revealed that those variables had very different impacts on the two different components of creativity that were measured. Therefore, any future study can concentrate on examining the effects of the variables on specific components of creativity. In the present study, these specific components were only considered because they were part of an overall measurement for creativity, but the study revealed that these components of creativity were affected in different ways.

The results of the experiments also showed that the different types of involvement as variables had different effects on creativity. In a future study there can be more investigation of much wider forms of engagement between adults and children when children are engaged in art. Moreover, within each variable there were certain components that were derived from the primary research, for example within engagement there is feedback, suggestions and encouragement and a future study could break down the variables and investigate the effect of their component parts.

### **6.7.7 Investigate of Different Factors on Creativity**

Although one of the ideas that this study was based on was that whatever children produce is pure and should not be judged and there is no relative difference between children's creativity, children may be different in their ability to be more creative when placed in different situations such as the experiment of this study or under the influence of different variables. Therefore, any future study should consider the influence of variables such as the environment, gender or culture with and without influence variables.

The study was set in a specific cultural setting with a specific ethnic group: any future study could examine the wider context as a cultural influence together with the pedagogical and environmental factors that have been addressed in this study. This could be achieved through carrying out the same experimentation but in different contexts, for example, in the UK and Saudi Arabia to see if there is a difference in results between the two cultures.

Furthermore, this study involved only male pupils: a future study could investigate the effect of the variables on female pupils as well in order to see if gender is a factor for the influence of pedagogical factors on creativity in children.

### **6.7.8 Develop Approach**

While it is acknowledged that art by children free from adult influence do exist, for example in the form of doodles, it is very difficult at this point in time to cultivate this through an applied technique because often adults are present. A future study could design an approach or technique, based on the principles of the present study, to provide the opportunity to cultivate art that would otherwise be left at the back of exercise books or post it notes, in other words a cultivation of the child's imagination. In relation to this idea, one of the contributions of the study was to show that principles of the existing participatory approach continuum (Read et al., 2002, Druin, 2002) could be extended to independent approach as shown in table 40. This new design paradigm, or independent approach, brings a new approach to design to the world.

This could be achieved by allowing children to create independently in the production of their designs in 2D and 3D products. This study could consider how the principles of independent approach could be achieved through the use of technology such as 3D printing to allow children to be independently creative for more of the design process. Specifically, the study could look at how technology could contribute to achieving independent approach where the technology itself could remove the need for adult intervention. This could be achieved through consideration of technology that is easy and safe for use by children.

### **6.7.9 Creativity in 2D and 3D products**

In relation to this idea, a future study could investigate the creativity of 2D and 3D products in order to see if the findings of the present study would also be found in relation to products as well as their designs. This would test if creativity is something that is impeded by certain types of adult involvement in product design. Moreover, this would allow the principles of independent approach not only to be extended within art and design curriculums in school but also the possible extension to the commercial world where children could be included.

The 2D and 3D production where children are encouraged to make the link between design and production is an extension of the realisation of the imagination of the child. Kristensen (2004) in reference to rapid prototyping, advocated the idea of materialisation, which involves the transformation of ideas into material objects, thus transforming concepts into sensory experiences, in line with embodied cognitive theory (Clark, 1997).

### **6.7.10 Develop Method for Judging**

The attributes of the children's drawings that were measured in this study were based on an existing model to measure creativity and there was a need to modify the model in order to look for signs of influence in the children's work. Therefore, in future study there needs to be the development of dimensions, subscales and adjective pairs that reflect the aims of a study that seeks to investigate creativity in a school setting.

Another important consideration for the study is that judgement about creativity was made by adults, specifically, experts who are well experienced in art. However, this was unavoidable because there needed to be a way of judging creativity. A recommendation for future study is to find a way of recognising and assessing creativity from a more neutral perspective rather than that of adults well versed in the world of art and design and children. After all, one of the issues that was raised in the review of the literature was that art by children is often unduly judged according to adult perceptions and that a significant influence on children was adults judging their work.

### **6.7.11 Environment**

Children are often engaged in creativity in an environment where power structures exist, for example, in the school with teachers or at home where there are adults present. It may be the case that different locations have different effects on creativity and a future study could test these influences. This could be achieved through testing the effects on creativity of different environments and making comparisons between them. The environments could include the school, the home, local community centres and playgrounds.

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# APPENDIX

# **An Investigation Into the Effects of Teacher Involvement and Influence on the Creativity of Children in the Classroom in Saudi Arabia**

Participant Information Sheet (Questionnaire)

**Dear Teacher,**

We would like you to take part in a study about children's participation in design conducted by a researcher at De Montfort University in the United Kingdom.

## **Introduction to the study**

Design by children is often influenced by involvement from adults and their educational environment and children are often not given the opportunity to fully utilise their creativity to realise their imagination in design. This study aims to investigate the effect of teacher involvement on creativity in children when engaged in art and design. In order to achieve this aim there is a need to research current pedagogical approaches to design, the influence of the curriculum and class structure. Moreover, in order to understand your engagement with children in the art and design class we need you to tell us about your experiences of teaching children in this context.

Participation in this study is voluntary and will involve a questionnaire, which will take approximately 10 to 15 minutes.

You have the right to withdraw at any point during the research. Upon withdrawal from the research all of the obtained identifiable data will be destroyed, however, once the data has been anonymised it cannot be destroyed because it will be impossible to identify the origin of the data.

Excerpts from the questionnaires will be used in any publications derived from this study.

Confidentiality, privacy and anonymity are assured. If the researcher wants to use any quotations it will be anonymous. The distribution of the questionnaire will be through an online survey system, which will mean there is no identifying information, you will simply click on a link, complete the questionnaire and submit it.

The information that is gained in this research project will not be used for another project and will only be used strictly for purposes highlighted above.

All data will be kept in a secure location and is only accessible to the researcher and you will be able to request data at any time.

إذا تفضل الحصول على نسخة باللغة العربية الرجاء الاتصال بالباحث

If there are any questions regarding this research please contact:

Rafat Madani (PhD Researcher), Faculty of Technology, De Montfort University, 49 Oxford Street, Innovation Centre, LE1 5XY, Leicester, UK.

P08304456@myemail.dmu.ac.uk TEL: +44 7875782640

# **An Investigation Into the Effects of Teacher Involvement and Influence on the Creativity of Children in the Classroom in Saudi Arabia**

Participant Information Sheet (Interview)

**Dear Teacher,**

We would like you to take part in a study about children's participation in design conducted by a researcher at De Montfort University in the United Kingdom.

## **Introduction to the study**

Design by children is often influenced by involvement from adults and their educational environment and children are often not given the opportunity to fully utilise their creativity to realise their imagination in design. This study aims to investigate the effect of teacher involvement on creativity in children when engaged in art and design. In order to achieve this aim there is a need to research current pedagogical approaches to design, the influence of the curriculum and class structure. Moreover, in order to understand your engagement with children in the art and design class we need you to tell us about your experiences of teaching children in this context.

Participation in this study is voluntary and will involve an interview, which will take approximately 45 minutes to 1 hour. The interview will be audio recorded.

You have the right to withdraw at any point during the research. Upon withdrawal from the research all of the obtained identifiable data will be destroyed, however, once the data has been anonymised it cannot be destroyed because it will be impossible to identify the origin of the data.

Excerpts from the interviews will be used in any publications derived from this study.

Confidentiality, privacy and anonymity are assured. If the researcher wants to use any quotations it will be anonymous.

The information that is gained in this research project will not be used for another project and will only be used strictly for purposes highlighted above.

All data will be kept in a secure location and is only accessible to the researcher and you will be able to request data at any time.

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If there are any questions regarding this research please contact:

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P08304456@myemail.dmu.ac.uk TEL: +44 7875782640



# **An Investigation Into the Effects of Teacher Involvement and Influence on the Creativity of Children in the Classroom in Saudi Arabia**

Participant Information Sheet (Observation)

**Dear Teacher,**

We would like you to take part in a study about children's participation in design conducted by a researcher at De Montfort University in the United Kingdom.

## **Introduction to the study**

Design by children is often influenced by involvement from adults and their educational environment and children are often not given the opportunity to fully utilise their creativity to realise their imagination in design. This study aims to investigate the effect of teacher involvement on creativity in children when engaged in art and design. In order to achieve this aim there is a need to research current pedagogical approaches to design, the influence of the curriculum and class structure. Moreover, in order to understand your engagement with children in the art and design class the researcher needs to conduct classroom observation.

Participation is voluntary and you have the right to withdraw at any point during the research. Upon withdrawal from the research all of the obtained identifiable data will be destroyed, however, once the data has been anonymised it cannot be destroyed because it will be impossible to identify the origin of the data.

The results of the observation will be used in any publications derived from this study.

Confidentiality, privacy and anonymity are assured. The observation will be conducted during normal classroom time and the researcher will not engage the children or the teacher.

The information that is gained in this research project will not be used for another project and will only be used strictly for purposes highlighted above.

All data will be kept in a secure location and is only accessible to the researcher and you will be able to request data at any time.

إذا تفضل الحصول على نسخة باللغة العربية الرجاء الاتصال بالباحث

If there are any questions regarding this research please contact:

Rafat Madani (PhD Researcher), Faculty of Technology, De Montfort University, 49 Oxford Street, Innovation Centre, LE1 5XY, Leicester, UK.

P08304456@myemail.dmu.ac.uk TEL: +44 7875782640

# **An Investigation Into the Effects of Teacher Involvement and Influence on the Creativity of Children in the Classroom in Saudi Arabia**

Parent / Guardian Information Sheet (Experiment)

**Dear Parent / Guardian,**

We would like your child to take part in a study about children's participation in design conducted by a researcher at De Montfort University in the United Kingdom.

Design by children is often influenced by involvement from adults and their educational environment and children are often not given the opportunity to fully utilise their creativity to realise their imagination in design. The researcher will investigate the effects of teacher involvement on the creative ability of children through a series of experiments where the children will be requested to be creative under different conditions that reflect the different extent and type of involvement by teachers in the classroom.

**What will happen at the school?** The experiment will take place in the school environment under the supervision of the Art Teacher. The experiment will last for 90 minutes. During the experiment your child/children will be in their art classroom with other children and the teacher present, they will be engaged in drawing design with coloured pencils and pens and paper.

Confidentiality, privacy and anonymity are assured. Your child's identity will be protected throughout the study and data will be held in a secure location only to be used strictly for purposes of the study. Access to the data is for yourself and the researcher only and upon completion the data will be destroyed, however, you have the right to request a copy for yourself. Participation in this study is voluntary and you are free to remove your child from the study at any time by contacting the researcher, and all of the obtained identifiable data will be destroyed.

إذا تفضل الحصول على نسخة باللغة العربية الرجاء الاتصال بالباحث

If there are any questions regarding this research please contact:

**Rafat Madani** (PhD Researcher)

P08304456@myemail.dmu.ac.uk

TEL: +44 7875782640

# **An Investigation Into the Effects of Teacher Involvement and Influence on the Creativity of Children in the Classroom in Saudi Arabia**

Children Information Sheet (Experiment)

**Dear Pupil,**

We would like you to take part in a study about child-led design conducted by a researcher at De Montfort University in the United Kingdom.

The design that you produce is often influenced by adults around you such as your teacher or parents and we understand that you are often not given the opportunity to fully use your creative ability to realise your imagination when you are designing. The researcher wants to investigate how teachers influence your creativity.

Participation in this study is voluntary and you are free to leave the study at any time by telling the researcher. Upon withdrawal from the research all of the obtained data will be destroyed, however, once the data has been anonymised it cannot be destroyed because it will be impossible to identify the origin of the data.

Confidentiality, privacy and anonymity are assured. Your identity will be protected throughout the study. Data obtained from this study will be held in a secure location and will not be used for another project and will only be used strictly for purposes highlighted above and is only accessible to yourself, your parents, your form teacher and the researcher.

If you require this document in Arabic please contact:

إذا تفضل الحصول على نسخة باللغة العربية الرجاء الاتصال بالباحث

If there are any questions regarding this research please contact:

Rafat Madani (PhD Researcher)

Faculty of Technology, De Montfort University, 49 Oxford Street, Innovation Centre, LE1 5XY, Leicester, UK,  
[P08304456@myemail.dmu.ac.uk](mailto:P08304456@myemail.dmu.ac.uk) TEL: +44 7875782640

## An Investigation Into the Effects of Teacher Involvement and Influence on the Creativity of Children in the Classroom in Saudi Arabia

### Consent Form for Questionnaire - Teacher

Issue	Participant's initial
I have read the information provide in the information sheet about the study titled " Realising a child's imagination in Product design for both two-dimensional and three dimensional products through a child led system".	
I have been given the opportunity to ask questions about this study, the answers were satisfactory and I was provided with additional information that I requested.	
I understand that participation is voluntary and I have the right to withdraw from the study at any time and my data destroyed.	
I am aware of the fact that excerpts from the questionnaire may be used in publications derived from this study, and all data will be anonymised.	
I have been informed that the data will be kept secure and will be for research purposes only and at any time I can request a copy of the data or remove my data. I have also been made aware that the survey will be conducted online with no identifying information to further protect anonymity.	
I have been informed that the data will be destroyed upon completion of the study.	
I acknowledge that some of the data collected during this study may be looked at by some people at De Montfort University or from regulatory authorities concerned with education where it is related to my participation this study. Moreover, I give consent for such individuals to be allowed access to my responses.	
I have been given the opportunity to request both the information sheet and this consent form in Arabic. إذ ترغب الحصول على نسخة باللغة العربية من جميع المستندات يمكنك طلب ذلك من الباحث	

With knowledge of the above-stated issues, I agree to participate in this study.

I agree to future contact by the researchers if my responses reveal interesting findings or for cross reference purposes.

☐ Yes ☐ No

If answered yes, the suitable method of being contacted is:

☐ telephone ..... ☐ email .....

## An Investigation Into the Effects of Teacher Involvement and Influence on the Creativity of Children in the Classroom in Saudi Arabia

### Consent Form for Interview - Teacher

Issue	Participant's initial
I have read the information provide in the information sheet about the study titled " Realising a child's imagination in Product design for both two-dimensional and three dimensional products through a child led system".	
I have been given the opportunity to ask questions about this study, the answers were satisfactory and I was provided with additional information that I requested.	
I understand that participation is voluntary and I have the right to withdraw from the study at any time and my data destroyed.	
I am aware of the fact that excerpts from the interview may be used in publications derived from this study, and all data will be anonymised. I am aware that the interviews will be audio recorded.	
I have been informed that the data will be kept secure and will be for research purposes only and at any time I can request a copy of the data or remove my data.	
I have been informed that the data will be destroyed upon completion of the study.	
I acknowledge that some of the data collected during this study may be looked at by some people at De Montfort University or from regulatory authorities concerned with education where it is related to my participation this study. Moreover, I give consent for such individuals to be allowed access to my responses.	
I have been given the opportunity to request both the information sheet and this consent form in Arabic. إذ ترغب الحصول على نسخة باللغة العربية من جميع المستندات يمكنك طلب ذلك من الباحث	

With knowledge of the above-stated issues, I agree to participate in this study.

I agree to future contact by the researchers if my responses reveal interesting findings or for cross reference purposes.

☐ Yes ☐ No

If answered yes, the suitable method of being contacted is:

☐ telephone ..... ☐ email .....

## An Investigation Into the Effects of Teacher Involvement and Influence on the Creativity of Children in the Classroom in Saudi Arabia

### Consent Form of Observation – Teacher

Issue	Participant's initial
I have read the information provide in the information sheet about the study titled " Realising a child's imagination in Product design for both two-dimensional and three dimensional products through a child led system".	
I have been given the opportunity to ask questions about this study, the answers were satisfactory and I was provided with additional information that I requested.	
I understand that participation is voluntary and I have the right to withdraw from the study at any time and my data destroyed.	
I am aware of the fact that results of the observation may be used in publications derived from this study, and all data will be anonymised.	
I have been informed that the data will be kept secure and will be for research purposes only and at any time I can request a copy of the data or remove my data.	
I have been informed that the data will be destroyed upon completion of the study.	
I acknowledge that some of the data collected during this study may be looked at by some people at De Montfort University or from regulatory authorities concerned with education where it is related to my participation this study. Moreover, I give consent for such individuals to be allowed access to the results.	
I have been given the opportunity to request both the information sheet and this consent form in Arabic. إذ ترغب الحصول على نسخة باللغة العربية من جميع المستندات يمكنك طلب ذلك من الباحث	

With knowledge of the above-stated issues, I agree to participate in this study.

I agree to future contact by the researchers if the results reveal interesting findings or for cross reference purposes.

☐ Yes ☐ No

If answered yes, the suitable method of being contacted is:

☐ telephone ..... ☐ email .....

Participant Name:			
Participant Signature:		Date	

## An Investigation Into the Effects of Teacher Involvement and Influence on the Creativity of Children in the Classroom in Saudi Arabia

### Consent Form for Experiment – Parents / Guardians

Issue	Participant's initial	
I have read the information provide in the information sheet about the study titled " Realising a child’s imagination in Product design for both two-dimensional and three dimensional products through a child led system".		
I have been given the opportunity to ask questions about this study, the answers were satisfactory and I was provided with additional information that I requested.		
I have been made aware that all findings will be anonymised.		
I understand that my participation and my child’s participation is voluntary and I have the right to withdraw my child from the study at any time and any associated data destroyed.		
I am aware that my child will take part in a design exercise experiment and I wholly agree to this.	Agree	Disagree
I also understand the experiment will take place in premises outside of the school.	Agree	Disagree
I have been informed that any data will be used for research purposes only and will be kept in a secure location accessible only by the researcher.		
I have been informed that I have the right to review the data at any time and I have the right to request the data.		
I acknowledge that some of the data collected during this study may be looked at by some people at De Montfort University or from regulatory authorities concerned with education where it is related to my participation this study. Moreover, I give consent for such individuals to be allowed access to my responses.		
I have been given the opportunity to request both the information sheet and this consent form in Arabic.  إذ ترغب الحصول على نسخة باللغة العربية من جميع المستندات يمكن طلب ذلك		

With knowledge of the above-stated issues, I agree to participate in this study.

I agree to future contact by the researchers if my responses reveal interesting findings or for cross reference purposes.

## An Investigation Into the Effects of Teacher Involvement and Influence on the Creativity of Children in the Classroom in Saudi Arabia

### Consent Form for Pupils

Issue	Participant's initial
I have read the information provide in the information sheet about the study titled " Realising a child's imagination in Product design for both two-dimensional and three dimensional products through a child led system".	
I have been given the opportunity to ask questions about this study, the answers were satisfactory and I was provided with additional information that I requested.	
I understand that participation is voluntary and I have the right to withdraw from the study at any time and my data destroyed.	
I am aware of the fact that the design experiment will take place in premises outside of the school.	
I have been informed that the data will be kept secure and will be for research purposes only and at any time I can request a copy of the data or remove my data.	
I have been informed that the data will be destroyed upon completion of the study.	
I acknowledge that some of the data collected during this study may be looked at by some people at De Montfort University or from regulatory authorities concerned with education where it is related to my participation this study. Moreover, I give consent for such individuals to be allowed access to my responses.	
I have been given the opportunity to request both the information sheet and this consent form in Arabic. إذ ترغب الحصول على نسخة باللغة العربية من جميع المستندات يمكنك طلب ذلك من الباحث	

With knowledge of the above-stated issues, I agree to participate in this study.

I agree to future contact by the researchers if my responses reveal interesting findings or for cross reference purposes.

☐ yes ☐ no

If answered yes, please inform your form teacher.

Participant Name:			
Participant Signature:		Date	



## Teacher Questionnaire

**Dear Teacher,**

As you have been informed, this study aims to understand how teacher involvement has an effect on creativity during the art and design class. As part of achieving this aim the researcher needs to understand the classroom which includes the structure of the class and how teachers engage with children during art and design activities.

The questions are designed to provide the researcher insight information about you as a teacher and the children as designers within a school context.

**Your anonymity is guaranteed and you have the right to withdraw from the study at anytime.**

Please try to complete all of the questions. If you have any questions please feel free to contact the researcher. Contact details are provided below.

**I would like to thank you for your invaluable contribution to the study.**

**Please tick the appropriate boxes** ☐

**Rafat Madani** (PhD Researcher)

Faculty of Technology

*De Montfort University*

49 Oxford Street, Innovation Centre, LE1 5XY, Leicester, UK

[P08304456@myemail.dmu.ac.uk](mailto:P08304456@myemail.dmu.ac.uk)

TEL: UK +44 7875782640

KSA +966555522977

Gender: ☐ Male ☐ Female ☐

Numbers of years of experiences ☐

What age group do you teach? ☐ 9 ☐ 10 ☐ 11 ☐ 12

How many pupils in your class? ☐

Is your class? ☐ Male ☐ Female ☐ Mixed

---

### Questionnaire – Teachers

#### 3. Please indicate the current practical methods that you use with the children:

☐ Screen printing ☐ Dyeing ☐ Design Transfer ☐ Sewing Embroidery ☐ Woodwork ☐ Modelling  
☐ Sculpture ☐ 3D Printing ☐ Other, please indicate.....

#### 4. Please indicate the practical methods that you feel children are competent with:

☐ Screen printing ☐ Dyeing ☐ Design Transfer ☐ Sewing Embroidery ☐ Woodwork ☐ Modelling  
☐ 3D Modelling (CAD) ☐ 3D Printing ☐ Other, please indicate.....

#### 5. Children often ask questions; are they dependent on you because they do not want to use their own initiatives and work independently.

☐ Strongly agree ☐ Agree ☐ Neither agree or disagree ☐ Disagree ☐ Strongly disagree

#### 6. Please tell us about how the time is allocated in each session, in terms of the time given to children to design free and independently, time given for instruction and time working collaboratively with the teacher.

.....

.....

.....

#### 7. If you leave the children alone and allow them to work more independently it is better, meaning that they produce more creative designs.

☐ Strongly agree ☐ Agree ☐ Neither agree or disagree ☐ Disagree ☐ Strongly disagree

#### 8. Children are given the opportunity to express themselves artistically.

☐ Strongly agree ☐ Agree ☐ Neither agree or disagree ☐ Disagree ☐ Strongly disagree

#### 9. Your involvement is necessary in the following parts of the design process

☐ Instruction ☐ Encouraging ☐ Providing feedback ☐ Discussion ☐ Monitoring ☐ all  
☐

**10. At which stage of the design process are you more involved with the children and why?**

.....

.....

.....

**11. Which practical aspects, such as screen printing or model making, do you have to help children with and which practical aspects can the children do independently?**

.....

.....

.....

**12. Please indicate the extent to which the following types of involvement positively or negatively influence a child's creativity**

(1 = strongly positive 2 = positive 3 = neutral 4 = negative 5 = strongly negative) Please circle as appropriate.

- |                             |   |   |   |   |   |
|-----------------------------|---|---|---|---|---|
| • <i>Instructing</i>        | 1 | 2 | 3 | 4 | 5 |
| • <i>Encouraging</i>        | 1 | 2 | 3 | 4 | 5 |
| • <i>Providing feedback</i> | 1 | 2 | 3 | 4 | 5 |
| • <i>Discussion</i>         | 1 | 2 | 3 | 4 | 5 |
| • <i>Monitoring</i>         | 1 | 2 | 3 | 4 | 5 |

**13. Please tell us about how long the classes are and how you divide this time in terms of giving instruction, designing and assessment and also when do children start losing concentration and become less creative.**

.....

.....

.....

**14. Do you feel that your involvement can be a barrier to the child's ability to be independently creative?**

.....

.....

.....

**15. Often the children's designs are very similar to each other because of pre-determined design activity.**

☐ *Strongly agree*   ☐ *Agree*   ☐ *Neither agree or disagree*   ☐ *Disagree*   ☐ *Strongly disagree*

**16. There a high amount of individuality in children's art and design.**

☐ *Strongly agree*   ☐ *Agree*   ☐ *Neither agree or disagree*   ☐ *Disagree*   ☐ *Strongly disagree*

**17. Which group of the children do you give more of your attention and time to?**

☐ *Advanced ability* ☐ *Normal ability* ☐ *Limited ability* ☐ *Equal attention* ☐ *No attention*

**18. Your choice of materials is based on the creative activity**

☐ *Strongly agree* ☐ *Agree* ☐ *Neither agree or disagree* ☐ *Disagree* ☐ *Strongly disagree*

**19. The restriction of materials specified in the curriculum negatively affect the children's ability to produce designs**

☐ *Strongly agree* ☐ *Agree* ☐ *Neither agree or disagree* ☐ *Disagree* ☐ *Strongly disagree*

**20. You allow the children a free choice of materials**

☐ *Strongly agree* ☐ *Agree* ☐ *Neither agree or disagree* ☐ *Disagree* ☐ *Strongly disagree*

**21. Please tell us about the different environments (classroom, art and design hall, play area, etc.) that you teach design and how these have an effect on the children's creative ability.**

.....

.....

.....

**22. Please list the factors that you think affect children's ability to concentrate.**

.....

.....

.....

**23. Your personal opinion is a good indicator of the quality and creativity of the child's designs.**

☐ *Strongly agree* ☐ *Agree* ☐ *Neither agree or disagree* ☐ *Disagree* ☐ *Strongly disagree*

**24. The standards and outcomes set out in the curriculum can best assess the child's creative ability.**

☐ *Strongly agree* ☐ *Agree* ☐ *Neither agree or disagree* ☐ *Disagree* ☐ *Strongly disagree*

**25. Which design activities do children prefer?**

.....

.....

**26. Which activities are children more interested in and excited about?**

.....

.....

**27. Which activities do children seem to dislike?**

.....

.....

**28. Children naturally have the creative ability to realise their imaginations.**

☐ *Strongly agree*   ☐ *Agree*   ☐ *Neither agree or disagree*   ☐ *Disagree*   ☐ *Strongly disagree*

**29. Some children have to be taught creative ability.**

☐ *Strongly agree*   ☐ *Agree*   ☐ *Neither agree or disagree*   ☐ *Disagree*   ☐ *Strongly disagree*

**30. What are the potential benefits that you can see from the proposed approach to eliciting the child's imagination in art and design?**

.....

.....

.....

**31. What suggestions do you have for the development of the system that will achieve the proposed idea?**

.....

.....

.....

## Data Analysis (Questionnaire)

### INTRODUCTION

The primary research aim of this study is to offer an understanding of children's design activities in relation to participation, teacher involvement and diverse influences. Therefore, in order to achieve this aim the researcher needs to understand the contexts in which children currently design. The results of this research will also help to further identify forms of adult involvement and influences in this area of study. For the purposes of this research, primary data was collected using a questionnaire that was distributed to a number of art and design teachers in a variety of schools in Saudi Arabia (Mecca region).

#### Sample demographic characteristics

**Table 1 Sample distribution according to gender.**

		gender			
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	40	100.0	100.0	100.0
	Total	40	100.0	100.0	

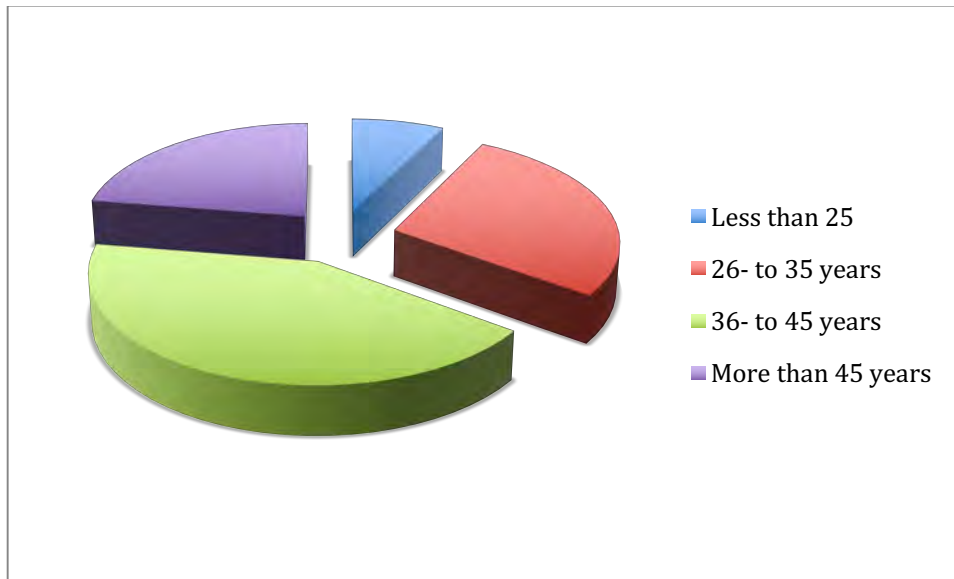
The data in the above Table 1 shows that 34.9 percent of the participants were men and that the majority were women with a percentage of 65.1 percent.

**Table 2 Sample distribution according to age.**

sample distribution according to age			
	Frequency	Percent	Cumulative Percent
Less than 25	3	7.5	7.5
26- to 35 years	11	27.5	35
Valid 36- to 45 years	17	42.5	77.5
More than 45 years	9	22.5	100.0
Total	40	100.0	

With regards to the ages of participants 7.5 percent were below 25 years of age, and 27.5 percent were between 26-35 years; whilst 42.5 percent were between 36-to 45 and 22.5 percent were older than 45 years. Thus, the majority of the participants were younger teachers.

**Figure 2: Sample distribution according to age.**



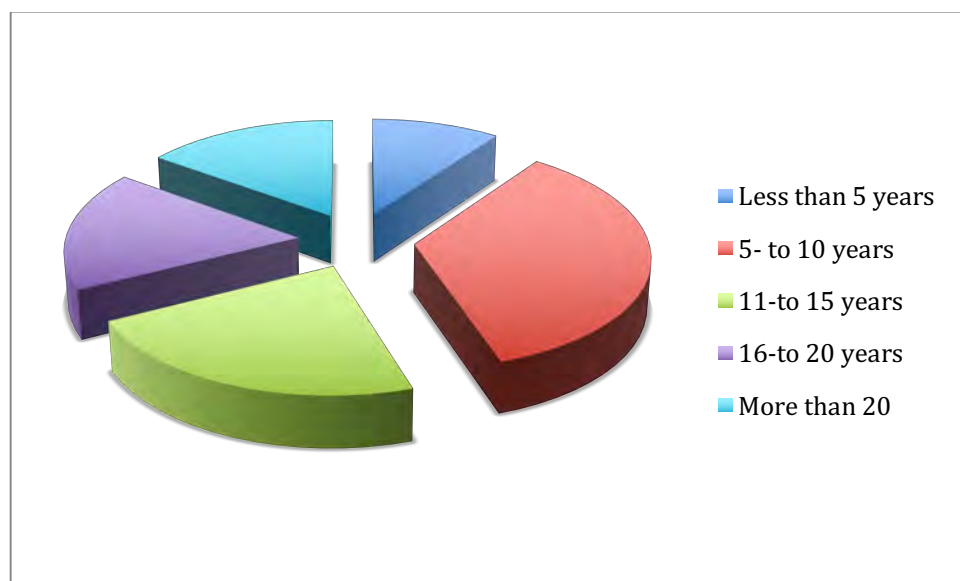
**Source: Researcher's survey**

**Table 3 Distribution according to length of experience.**

Number of years experience in teaching			
	Frequency	Percent	Cumulative Percent
Valid	Less than 5 years	4	10
	5- to 10 years	14	45
	11-to 15 years	9	67.5
	16-to 20 years	7	85
	More than 20	6	100
	Total	40	100

Table 3 shows the distribution according to the number of years of experience. Of the respondents, 45 percent, had less than ten years' experience and 55 percent had more than 10 years experience.

**Figure 3: Sample distribution according to experience.**



**Source: Researcher's survey**

## DESIGN METHODS

**Table 4 Current practical art and design methods.**

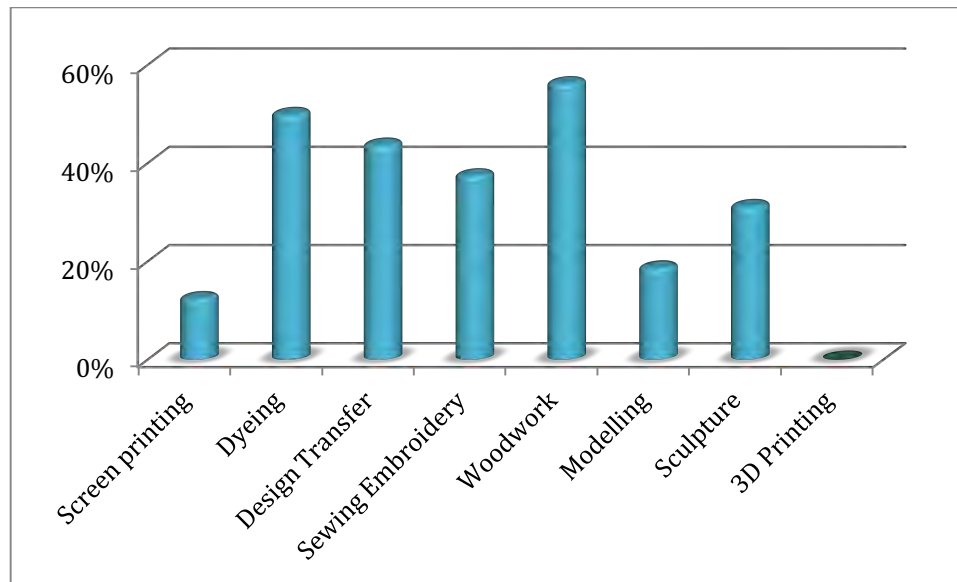
Current practical art and design methods			
	Frequency	Percent	Cumulative Percent
Screen printing	2	5.0	5.0
Dyeing	8	20.0	25.0
Design Transfer	7	17.5	42.5
Sewing Embroidery	6	15.0	57.5
Valid Woodwork	9	22.5	80.0
Modelling	3	7.5	87.5
Sculpture	5	12.5	100.0
3D Printing	0	0.0	100.0
Total	40	100.0	

The above Table 4 shows that the most popular method used in design with children was woodwork at 22.5 percent, followed by Dyeing at 20.0 percent. The two least popular methods were silk screen printing at 5.0 percent and 3D printing with no teachers using this method. Therefore, in 3D and silk screen printing the pupils had either received none or little teaching and therefore had no ideas or ways in which to approach the design using these methods. Moreover, the pupils were more likely to be lesser influenced by aspects of



participatory design using these methods than other methods; and therefore it was less likely that the majority of the pupils had established ways of using these methods learned in the classroom.

**Figure 4: Current practical methods used by pupils**



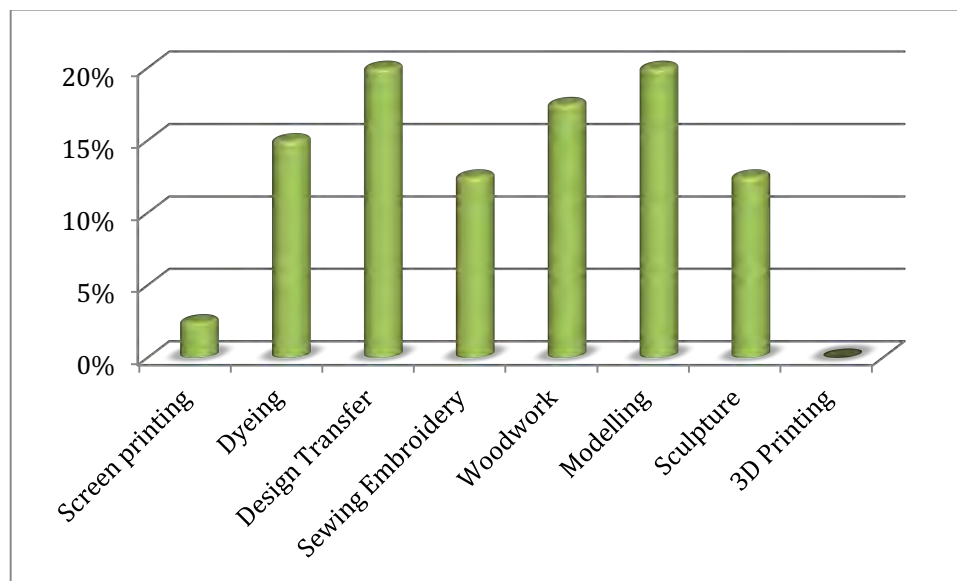
**Source: Researcher's survey**

**Table 5 Highest level of competence by method.**

Highest level of competence by method			
	Frequency	Percent	Cumulative Percent
Valid Screen printing	1	2.5	2.5
Dyeing	6	15.0	17.5
Design Transfer	8	20.0	37.5
Sewing Embroidery	5	12.5	50.0
Woodwork	7	17.5	67.5
Modelling	8	20.0	87.5
Sculpture	5	12.5	100.0
3D Printing	0	0.0	100.0
Total	40	100.0	

The results in Table 5 clearly show that the teachers felt that pupils were least confident with silk screen and 3D printing. These results concur with the results above regarding the current methods used, whereby these two methods were employed the least. Again the most popular method that was used was woodwork and the teachers felt that the pupils were the most competent in this.

**Figure 5: Competence by method**



**Source: Researcher's survey**

The teachers were asked which design activities their pupils preferred, which ones they were more interested in and excited about and which activities they seemed to dislike. The teachers suggested that their pupils preferred new and mysterious subjects of which they had no previous knowledge; and they they also liked work which involved colour, movement, printing and textiles, and that they were excited about these activities in addition to clay and glass work because it allowed them to express them selves. With regards to the design activities which their pupils disliked there were very few responses from the teachers, and these included learning theories of design and embroidery, however, a majority of the responses said nothing.

## MATERIAL

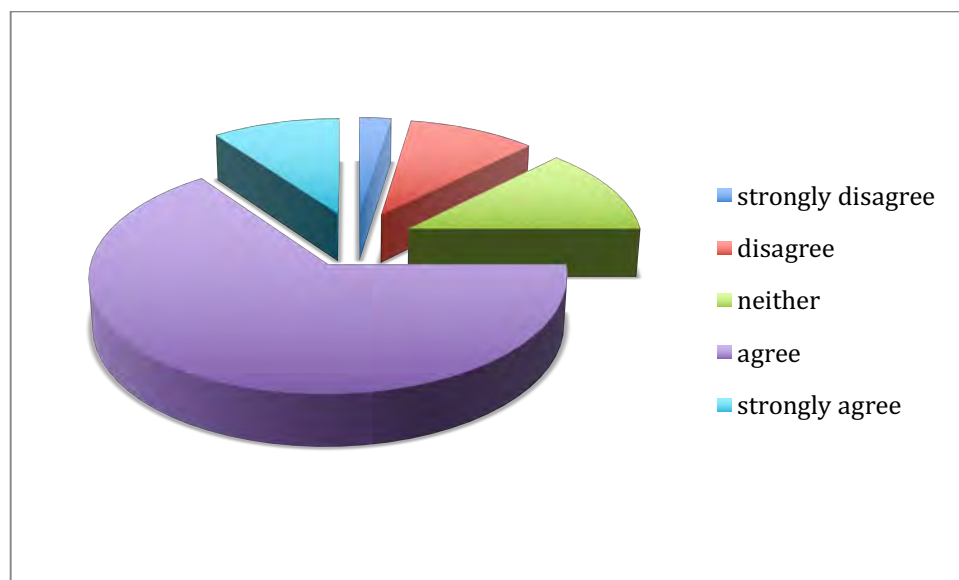
**Table 6 Choice of materials.**

**Statement: Your choice of materials is based on the creative activity**

	Frequency	Percent	Cumulative Percent
Strongly Disagree	1	2.5	2.5
Disagree	4	10.0	12.5
Neither	5	12.5	25.0
Agree	26	65.0	90.0
Strongly Agree	4	10.0	100.0
Total	40	100.0	

The majority of the teachers, 75 percent, agreed that they chose materials based on the design activity. This has provided a strong indication that materials were chosen for the pupils and they had less scope of choice in materials for the design activity.

**Figure 6: Choice of materials**



**Source: Researcher's survey**

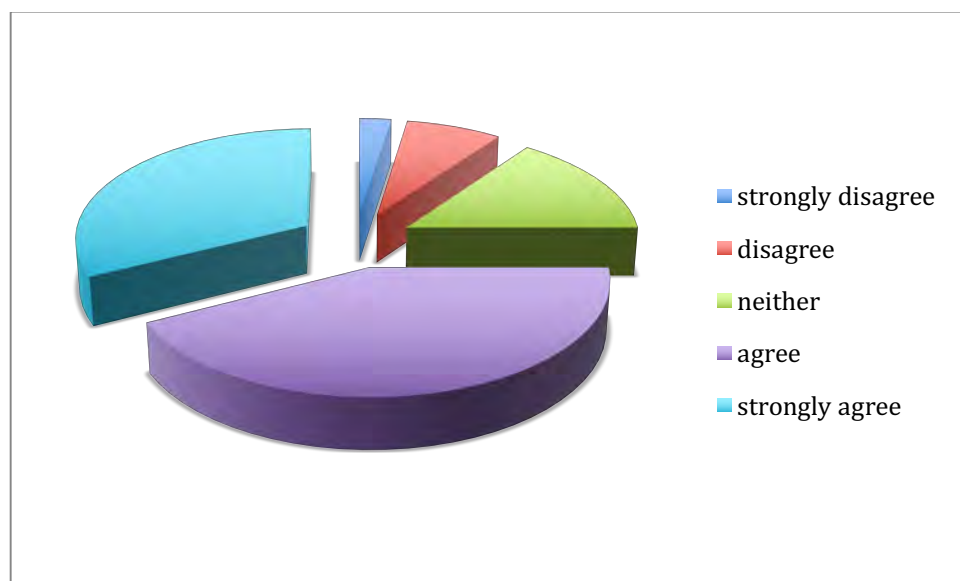
**Table 7 Free choice of materials.**

**Statement: You allow the children a free choice of materials**

	Frequency	Percent	Cumulative Percent
Strongly Disagree	1	2.5	2.5
Disagree	3	7.5	10.0
Neither	6	15.0	25.0
Agree	17	42.5	67.5
Strongly Agree	13	32.5	100.0
Total	53	100.0	

The majority of the teachers, 75 percent, agreed, of which 32.5 percent strongly agreed, with the idea that they allowed their pupils a free choice of materials. In consideration of the response to the previous statement and that the restriction of materials could negatively affects the ability to produce designs, it would seem evident that the teachers understood the importance of freedom of choice of materials in relation to design ability.

**Figure 7: Free choice of materials**



**Source: Researcher's survey**

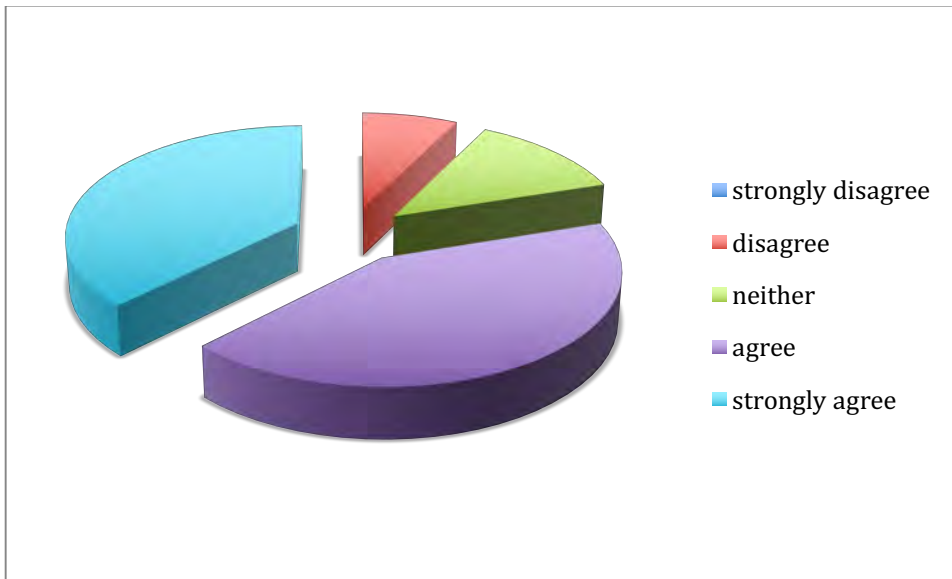
**Table 8 Influence of restriction of materials on ability to design.**

**Statement: The restriction of materials specified in the curriculum negatively affect the children's ability to produce designs?**

	Frequency	Percent	Cumulative Percent
Strongly Disagree	0	0	0.0
Disagree	3	7.5	7.5
Neither	5	12.5	20.0
Agree	17	42.5	62.5
Strongly Agree	15	37.5	100.0
Total	40	100.0	

From this question it was revealed that the majority of teachers, 80 percent, agreed that because the materials were restricted to those specified in the curriculum it had a negative effect on pupils' ability to produce design, of this majority, 37.5 percent strongly agreed. This is a clear indication that the teachers felt that more materials or freedom of choice in materials would lead to better creativity. This means that specified materials can be regarded as a significant factor affecting children's ability to produce creative designs. The response to this question is supported by the response to the previous question where teachers agreed with the idea of a free choice of materials in addition to recognising that children are restricted.

**Figure 8: Influence of restriction of materials on ability to design**



**Source: Researcher's survey**

## INVOLVEMENT

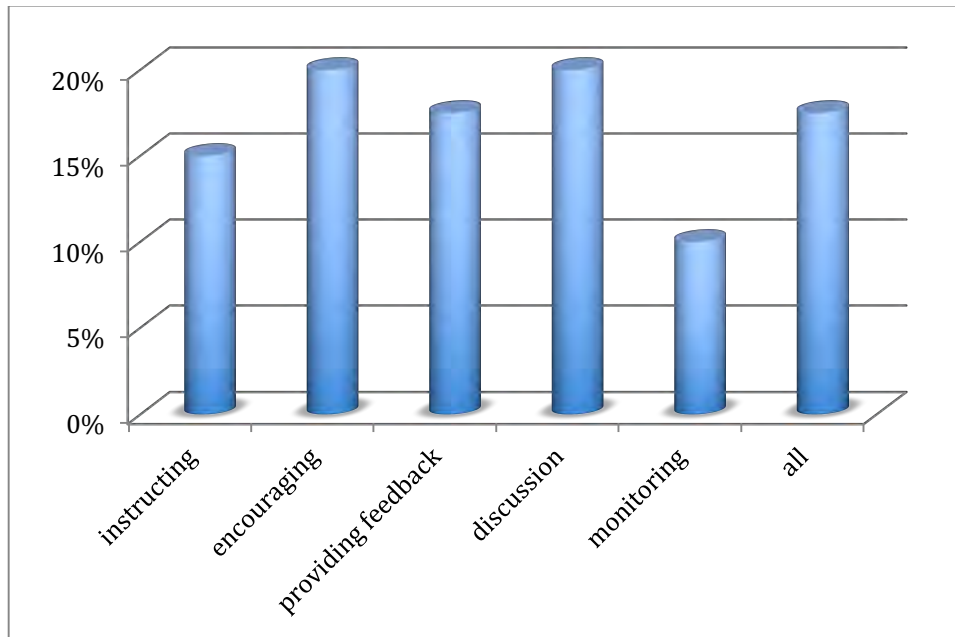
**Table 9 Necessity of involvement in design process activities.**

**Statement: Your involvement is necessary in the following parts of the design process**

	Frequency	Percent	Cumulative Percent
Instructing	6	15.0	15.0
Encouraging	8	20.0	35.0
Providing Feedback	7	17.5	52.5
Valid Discussion	8	20.0	72.5
Monitoring	4	10.0	82.5
All	7	17.5	100.0
Total	40	100.0	

Table 9 clearly shows that all of the teachers agreed that their involvement was necessary in different aspects of the design process; and more significantly, seven of the teachers felt that their involvement was necessary in all aspects of the design process. Encouraging pupils, discussion and providing feedback were felt to be the most necessary forms of involvement; and the review of the literature has already shown that the latter two are clearly a form of influence from adults.

**Figure 9: Necessity of involvement in design process activities**



**Source:**

#### **Researcher's survey**

In response to the open question: 'At which stage of the design process are you more involved with the children and why?' the majority of the teachers said they were less involved in the actual design phase and more involved in the implementation of the designs or production. The majority stated that during the design phase they only provided instruction and supervision without direct involvement. Moreover, responses to the open question about which practical aspects pupils needed help with and which aspects they could undertake independently, the majority of teachers confirmed that pupils needed help with new techniques with the final aim of enabling them to produce creative designs and discover new ways of doing things. The teachers did not offer specific practical aspects in their responses to this question.

The following question was designed to determine what types of involvement with their pupils were felt to positively or negatively influence pupil creativity.

**Table 10 Opinion of positive or negative influence of aspects of involvement.**

Types of involvement	Strongly positive	Positive	Neutral	negative	Strongly negative
<b>Instruction</b>	11(28%)	10 (25%)	13 (33%)	4 (10%)	2 (5%)
<b>Encouraging</b>	28 (70%)	3 (8%)	8 (20%)	0 (0%)	1 (3%)
<b>Providing feedback</b>	13 (33%)	14 (35%)	10 (25%)	2 (5%)	1 (3%)
<b>Discussion</b>	19 (48%)	13 (33%)	6 (15%)	1 (3%)	1 (3%)
<b>Monitoring</b>	15 (38%)	12 (30%)	11 (28%)	1 (3%)	1 (3%)

Overall the teachers were of the opinion that all forms of involvement had a positive effect on their pupils' creativity, with the majority of these teachers stating a strong positive effect. The most positive effect on creativity was felt to be encouraging the pupil, followed by discussion with the pupil, both of which are forms of influence. Conversely, the opinion that teachers' involvement had a negative effect was found to be extremely weak.

In response to the question regarding whether teacher's involvement could be a barrier to the children's ability to be independently creative, the majority of the teachers were of the opinion that their involvement would not be a barrier to creativity if it was solely focused on supervision and not about imposing any ideas on them. In addition to this, the majority confirmed that the role of the teacher needed to include supervision, and that they only gave supervision to determine whether children were doing well or not with the aim of correcting their work in order to be more creative.

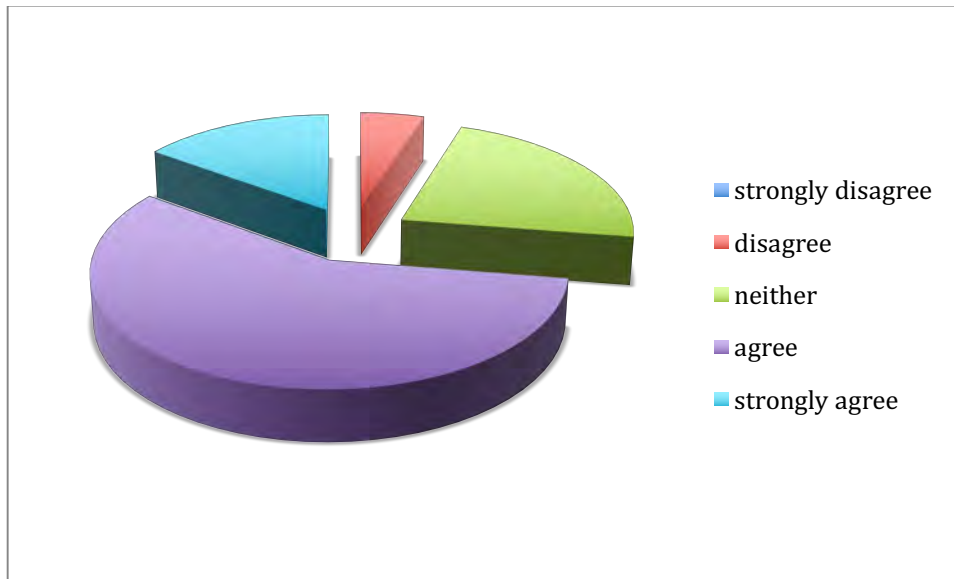
**Table 11 Teachers' personal opinion indicator of creativity.**

**Statement: Your personal opinion is a good indicator of the quality and creativity of the child's designs.**

	Frequency	Percent	Valid Percent	Cumulative Percent
Strongly Disagree	0	0	0	0.0
Disagree	2	5.0	5.0	5.0
Neither	9	22.5	22.5	27.5
Agree	23	57.5	57.5	85.0
Strongly Agree	6	15.0	15.0	100.0
Total	40	100.0	100.0	

The majority of the teachers (72.5 percent), were of the opinion that they were good judges of the children's creativity. This provided an indication that they could potentially give judgements to the children and could even control the design activity because they were confident about knowing what creativity was.

**Figure 10: Teachers' personal opinion indicator of creativity**



**Source: Researcher's survey**

Regarding the teachers' opinions about the factors which they thought affected children's concentration, the majority of teachers believed that there were both positive and negative factors which affected children's ability to concentrate.

The most important positive factors included positive encouragement; considering individual differences between students; intelligent feedback by the teacher; providing materials; a suitable environment; rewards, discussion and participation, and an indication that the task was creative and enabled children to concentrate. The negative factors which could affect the children's concentration included too many instructions and increased levels of discussion by the teacher, direct involvement in the children's work, the children's psychological state and the influence of other pupils.



## DEPENDENCY OF CHILDREN

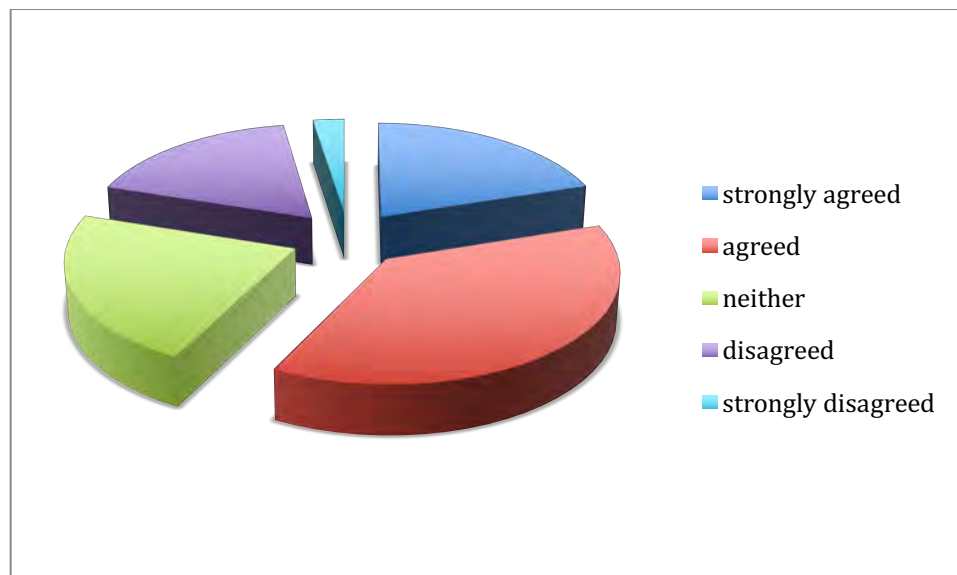
**Table 12 Dependency of children.**

**Statement: Children often ask questions; they are dependent on you because they do not want to use their own initiatives and work independently**

	Frequency	Percent	Cumulative Percent
Strongly Disagree	1	2.5	2.5
Disagree	7	17.5	20.0
Neither	9	22.5	42.5
Agree	15	37.5	80.0
Strongly Agree	8	20.0	100.0
Total	40	100.0	

The results in the above Table 12 show that there was a stronger agreement, 37.5 percent with 20 percent agreeing strongly, with the statement than there was disagreement at only 17.5 percent, of which only one person disagreed strongly with this statement. Therefore, a significant number of the teachers doubt the fact that children can work independently and as a result are dependent of the teacher, thus teachers assign more significance to their role.

**Figure 11: Dependency of children**



**Source: Researcher's survey**

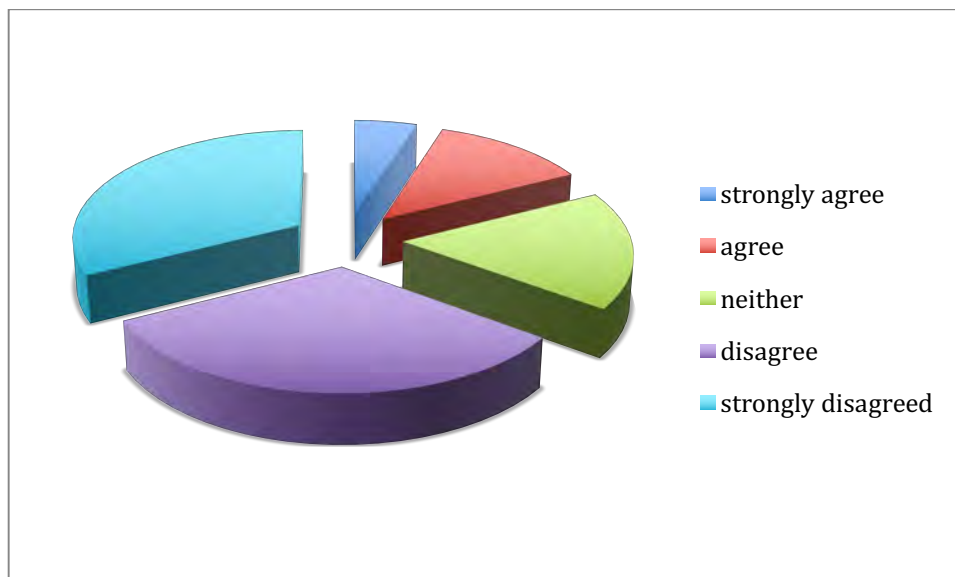
**Table 13 Agreement with independent working leads to more creative designs.**

**Statement: If you leave the children alone and allow them to work more independently it is better, meaning that they produce more creative designs**

	Frequency	Percent	Cumulative Percent
Strongly Disagree	13	32.5	32.5
Disagree	13	32.5	65.0
Neither	7	17.5	82.5
Agree	5	12.5	95.0
Strongly Agree	2	5.0	100.0
Total	40	100.0	

The majority of the teachers, 65 percent, equally disagreed and strongly disagreed with the idea that children who were left alone to work more independently produced more creative designs. Thus, it can be concluded that the majority of the teachers believed that it was not considered to be better to leave children alone and allow them to work more independently. This idea supports the responses to the previous question whereby teacher's assign importance to their role and a reflection of the fact that the teachers felt that their participation was necessary for helping children be more creative.

**Figure 12: Agreement with independent working leads to more creative designs**



**Source: Researcher's survey**

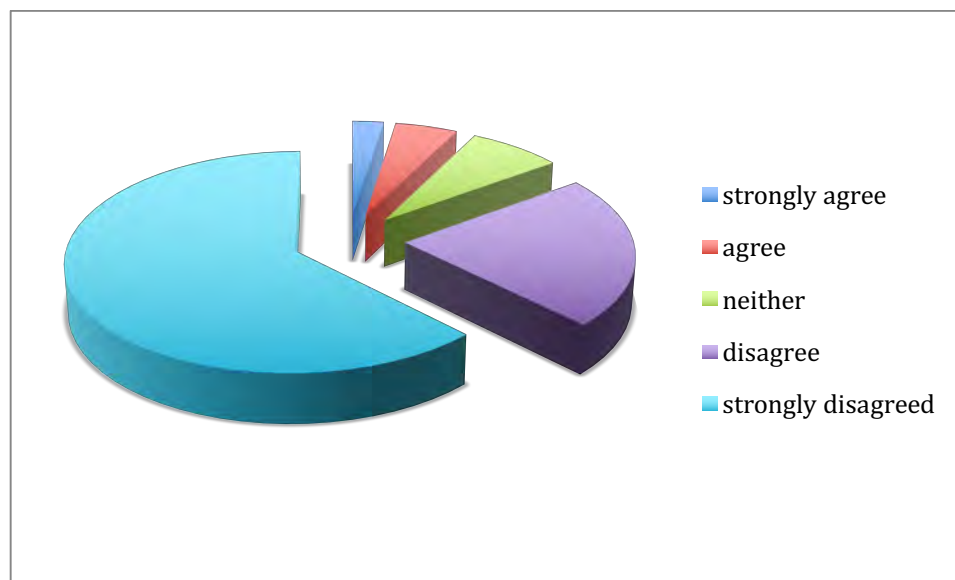
**Table 14 Agreement with idea children are given opportunity to express themselves artistically.**

**Statement: Children are given the opportunity to express themselves artistically.**

	Frequency	Percent	Cumulative Percent
Valid Strongly Disagree	25	62.5	62.5
Disagree	9	22.5	85.0
Neither	3	7.5	92.5
Agree	2	5.0	97.5
Strongly Agree	1	2.5	100.0
Total	40	100.0	

The majority of the teachers, 95 percent, disagreed, of which 62.5 percent, strongly disagreed with the fact that children were given the opportunity to express themselves artistically and only one of the respondents agreed. This clearly shows that there was a need to enable children to express themselves artistically in the classroom and that could be an indication that the teacher or the class structure impeded the pupils.

**Figure 13: Agreement with idea children are given opportunity to express themselves artistically**



**Source: Researcher's survey**

## CREATIVITY

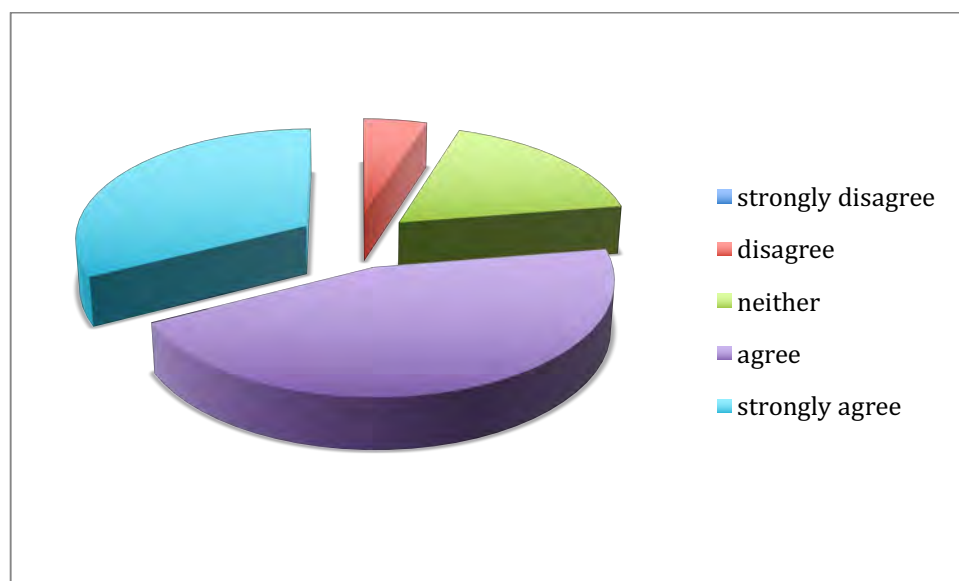
**Table 15 Creative ability to realise imagination.**

**Statement: Children naturally have the creative ability to realise their imaginations.**

	Frequency	Percent	Cumulative Percent
Valid Strongly Disagree	0	0	0.0
Disagree	2	5.0	5.0
Neither	7	17.5	22.5
Agree	18	45.0	67.5
Strongly Agree	13	32.5	100.0
Total	40	100.0	

The majority of teachers (77.5 percent), agreed with the idea that children had the creative ability to realise their imaginations. This indicates that teachers were confident in their pupils' creative ability, but as the above results show, felt that there involvement was necessary to foster their creativity.

**Figure 14: Creative ability to realise imagination**



**Source: Researcher's survey**

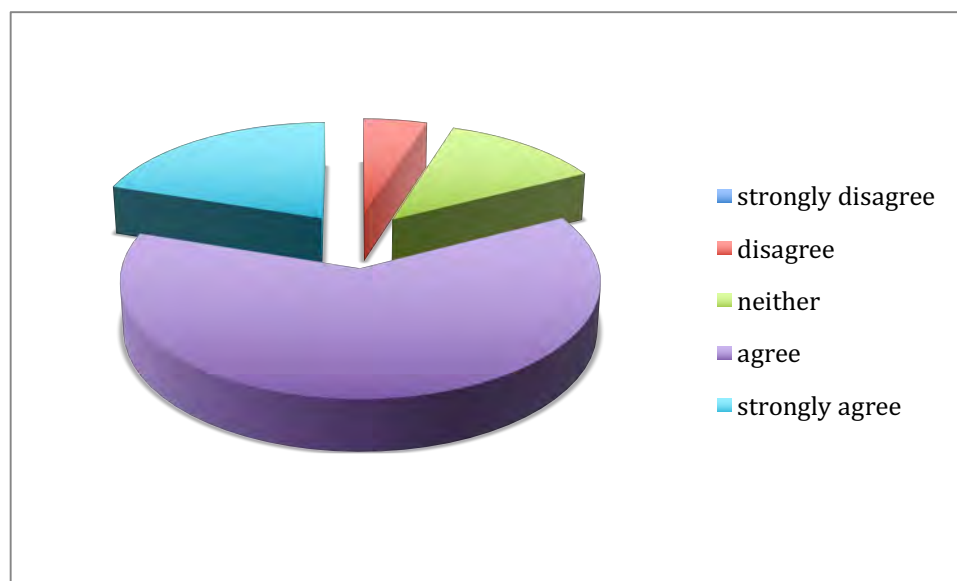
**Table 16 Ability has to be developed.**

**Statement: Some children have to be taught creative ability.**

	Frequency	Percent	Cumulative Percent
Strongly Disagree	0	0	0.0
Disagree	2	5.0	5.0
Neither	5	12.5	17.5
Agree	25	62.5	80.0
Strongly Agree	8	20.0	100.0
Total	40	100.0	

There was a high level of agreement (82.5 percent), suggesting that the teachers felt that children needed to develop their creativity. This further supports the importance teachers assign to their role to develop children's creativity.

**Figure 15: Ability is natural or ability has to be developed**



**Source: Researcher's survey**

## CLASS STRUCTURE

Regarding the responses to the open question about how the time was allocated in each session, in terms of the time given to children to design freely and independently, time given for instruction and working collaboratively with the teacher, it was found that the majority of the participants concentrated on giving time at the beginning of the session for discussion, and presenting previously implemented designs, brainstorming, and subsequently giving instructions, followed by leaving the children to work in collaboration. The majority of the teachers said that the total time for art and design sessions was ninety minutes, divided into twenty minutes for providing introduction to the subject of the session and instruction; and twenty minutes for preparing the materials. The remainder of the time was allocated for designing by the pupils. Interestingly, the majority of the teachers believed that the pupils felt frustrated if they were provided with a greater amount of instruction by the teacher.

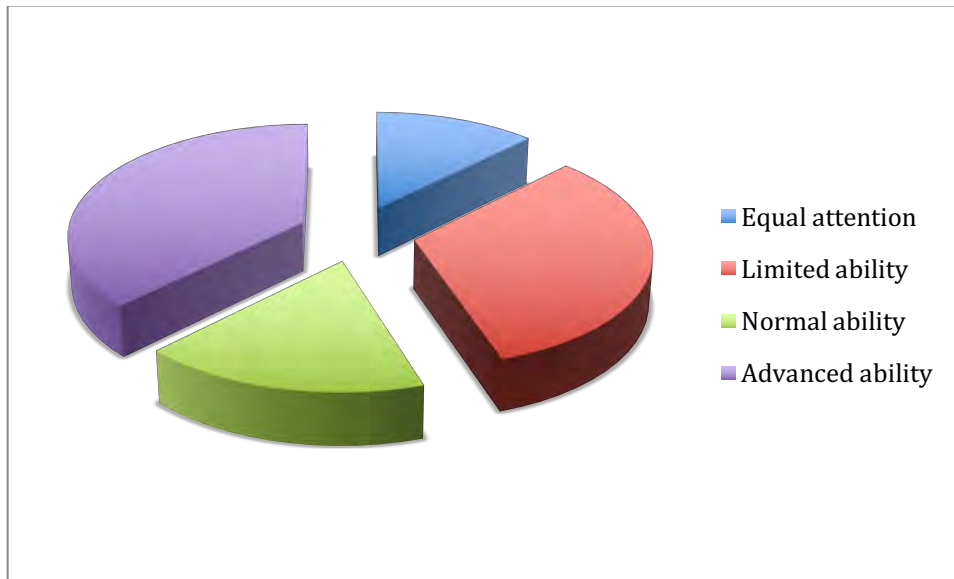
**Table 17 Attention and time given by pupil ability.**

**Question: Which group of the children do you give more of your attention and time to?**

		Frequency	Percent	Cumulative Percent
Valid	Equal Attention	5	12.5	12.5
	Limited Ability	13	32.5	45.0
	Normal Ability	7	17.5	62.5
	Advanced Ability	15	37.5	100.0
	Total	40	100.0	

When the teachers were asked about which group they provided most of their attention and time to, it was found that there was a generally equal distribution in responses, and this was in contrast to the idea that children with less ability would receive more attention.

**Figure 16: Attention and time given by pupil ability**



**Source: Researcher's survey**

## **CURRICULUM**

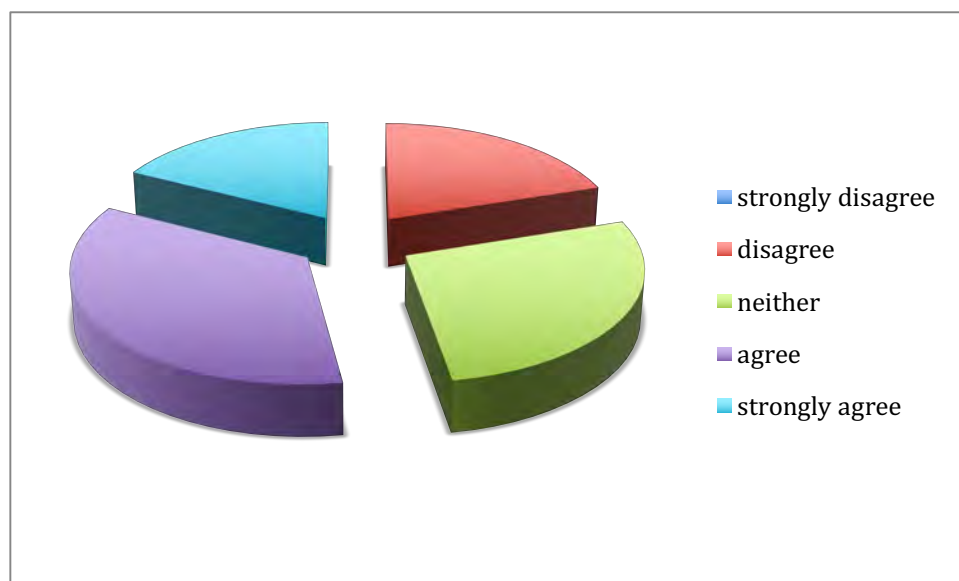
**Table 18 Curriculum requirements and standards can best assess creativity.**

**Statement: The standards and outcomes set out in the curriculum can best assess the child's creative ability.**

	Frequency	Percent	Cumulative Percent
Strongly Disagree	3	7.5	7.5
Disagree	4	10.0	17.5
Neither	8	20.0	37.5
Agree	16	40.0	77.5
Strongly Agree	9	22.5	100.0
Total	40	100.0	

The majority of the teachers (62.5 percent), agreed with the idea that the requirements of the curriculum were suitable for judging creativity; however, 17.5 percent disagreed with this idea. This provided an indication that the teachers judged creativity according to pre-determined standards.

**Figure 17: Curriculum requirements and standards can best assess creativity**



**Source: Researcher's survey**

**Table 19 Similarity of children's designs.**

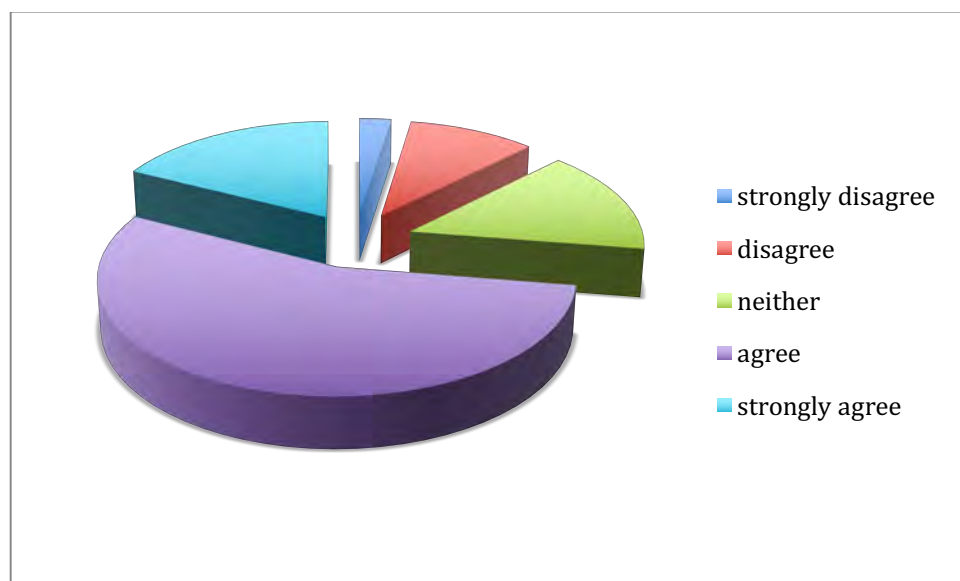
**Statement: Often the children's designs are very similar to each other because of pre-determined design activity**

	Frequency	Percent	Valid Percent	Cumulative Percent
Strongly Disagree	1	2.5	2.5	2.5
Disagree	4	10.0	10.0	12.5
Neither	6	15.0	15.0	27.5
Agree	22	55.0	55.0	82.5
Strongly Agree	7	17.5	17.5	100.0
Total	40	100.0	100.0	

In response to the above mentioned statement in Table 19 it was found that 72.5 percent of the teachers agreed that the design work by pupils was similar because the design activity was predetermined. However, a significant amount, 12.5 percent, of the teachers did disagree with this idea and 15 percent were unsure.



**Figure 18: Similarity of children's designs**



**Source: Researcher's survey**

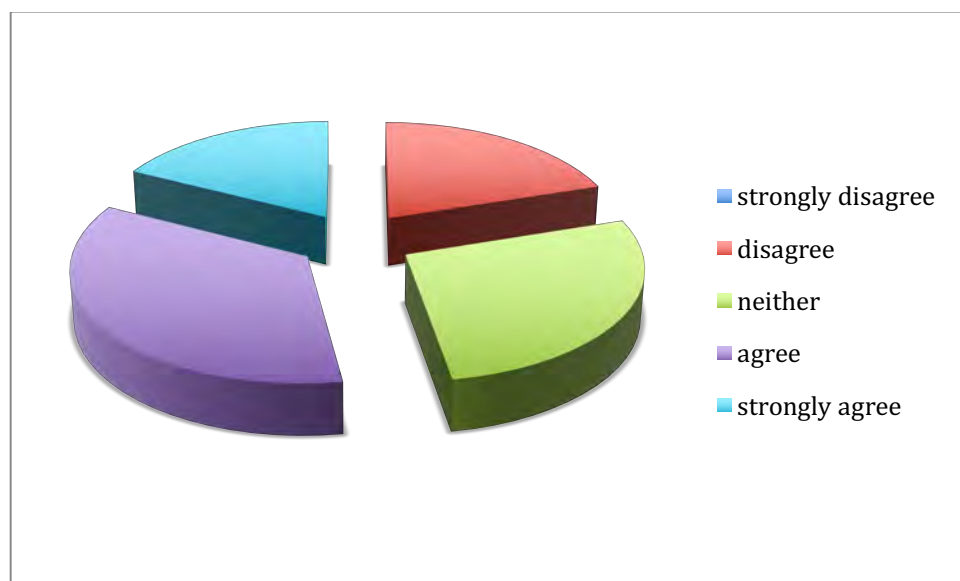
**Table 20 Individuality in children's art and design.**

**Statement: There is a high amount of individuality in children's art and design.**

	Frequency	Percent	Cumulative Percent
Strongly Disagree	0	0	0.0
Disagree	8	20.0	20.0
Neither	11	27.5	47.5
Agree	14	35.0	82.5
Strongly Agree	7	17.5	100.0
Total	40	100.0	

There was positive agreement in response to the above statement about a high amount of individuality in children's art and design. Thus 52.5 percent were in agreement of which 17.5 percent strongly agreed. This would seem to contradict the previous idea that there is similarity in creativity, however, the response here was not as strong as the previous question indicating that the teachers seemed to more sure that there is less individuality in the pupil's design.

**Figure 19: Individuality in children's art and design**



**Source: Researcher's survey**

## **ENVIRONMENT**

In response to the open question regarding the different environments (classroom, art and design hall and play area, etc.) where they taught design and how these had an effect on the children's creative ability, the majority of the teachers felt that the classroom was not a suitable environment for producing art and design and that an art and design hall was considered to be a more conducive environment for both imagination and creativity.

## **DISCUSSION**

With regards to the current design activities it was found that there were a wide variety of activities taking place; this included woodwork and modelling, as these were the most popular methods used in the classroom. The least popular, with very little or no experience were silk screen printing and 3D modelling.

The structure of the classes was generally well defined with sufficient time given to presenting the ideas or background to the subject and giving instructions. In relation to the latter, the teachers acknowledged that if they spent too much time on background detail and giving instructions, pupils concentration tended to wane. The remainder of the time was allocated to designing and then to evaluation and feedback. It was clear from the findings that the teachers felt that their role was very important and their involvement was essential to facilitate children to be creative. The teachers were confident in their role and the vast majority felt that they were the best judges of creativity and were also confident that the standards of the curriculum were suitable for judging creativity.

In reference to pupils depending on the teachers by asking questions and not relying on their own initiative, teachers were divided over this issue. However, there was stronger agreement regarding children being more dependent, a further indication of the importance that teachers assigned to their role. This idea is further supported by the fact that teachers felt very strongly that pupils would not be more creative if they were left alone to work more independently. This reinforces the idea that teachers felt that they had a role in children's creative processes. Looking more closely at the specific activities that teachers engaged in with the children it is also clear that teachers felt their involvement was necessary in all aspects particularly in areas such as providing feedback, monitoring and discussion.

All of these areas have already been shown to be major influences on children during the creative process. Moreover, the majority of the teachers were in agreement that their involvement in the various aspects of the participatory design process, such as instruction, discipline, encouraging and monitoring, had a strong positive effect on their pupils' creativity. Finally, the teachers were also strongly of the opinion that their involvement was not a barrier to their pupils' creativity, however, they did acknowledge the fact that this was only the case when they were merely supervising their pupils and not imposing their ideas. Moreover, the teachers stated that their involvement was necessary in order for their pupils to concentrate, and that their involvement in the form of feedback, encouragement, reward and participation all contributed to pupils' concentration. Although the teachers did suggest that there had to be a balance, and too much instruction or direct involvement in the pupils' work could negatively affect their concentration.

Teachers did suggest that they were less involved in the actual design process than they were in the production stage of the designs, and that this would also be the case for the experiment for the present study because teacher involvement during the practical aspects of the production stage cannot be avoided. A further indication of teachers' involvement and how it could affect children's ability to be creative was that the teachers' controlled the choice of materials that were used. However, it should be acknowledged that they did know that a restriction of materials would have a negative impact on their pupils' creative ability. It should be noted that the teachers were bound by the curriculum in their choice of materials and therefore, it was not necessarily they who were imposing the restrictions.

Overall, it is evident that the teachers are very much involved in the creative process and believe that their role is essential. Ultimately, their role is to develop their pupils' creative ability and this was supported by the fact that over 90 percent agreed with the idea that some children had natural creative ability; whilst for others this had to be taught. There was an acknowledgement that perhaps the children's designs were similar to each other because the design activity was predetermined, however, this was contradicted by the fact that

teachers said that there was individuality in the children's designs. Perhaps the teachers were referring to the fact that predetermined design activities would have a high level of influence on design outcomes.

In conclusion, the findings show that there is a high level of teacher involvement when pupils are engaged in the design process in school. Moreover, there has been some indication that this has an impact on design outcomes. However, there has been some acknowledgement of the fact that too much involvement may have a negative impact on creativity. Moreover, the influence over the children does not only come in the form of teacher involvement but also in the form of the restriction of materials.

# Experiments Analysis

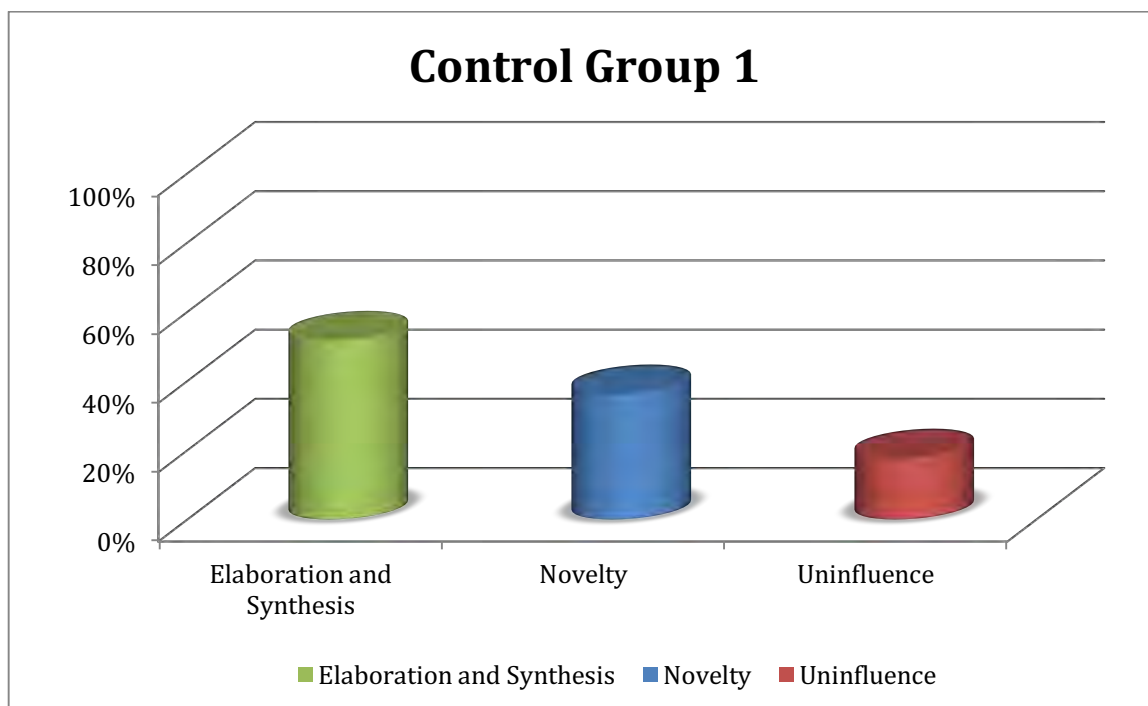
## Control Group 1 (Experiment 1)

Experiment 1 is the first control experiment and involves children designing under the three variables of instruction, engagement and evaluation.

The overall score for creativity which is comprised of the overall scores for elaboration and synthesis and novelty was at 44 percent. The overall creativity score for Elaboration and Synthesis was 52 percent and the overall score for Novelty was 36 percent. The overall score for Uninfluenced, which measures the level of influence in the designs was high at 18 percent.

Therefore, the presence of instruction, engagement and evaluation revealed low creativity score, while at the same time the presence of these factors are associated with a high level of influence in the designs Figure 10.

**Figure 10: Control Group 1**



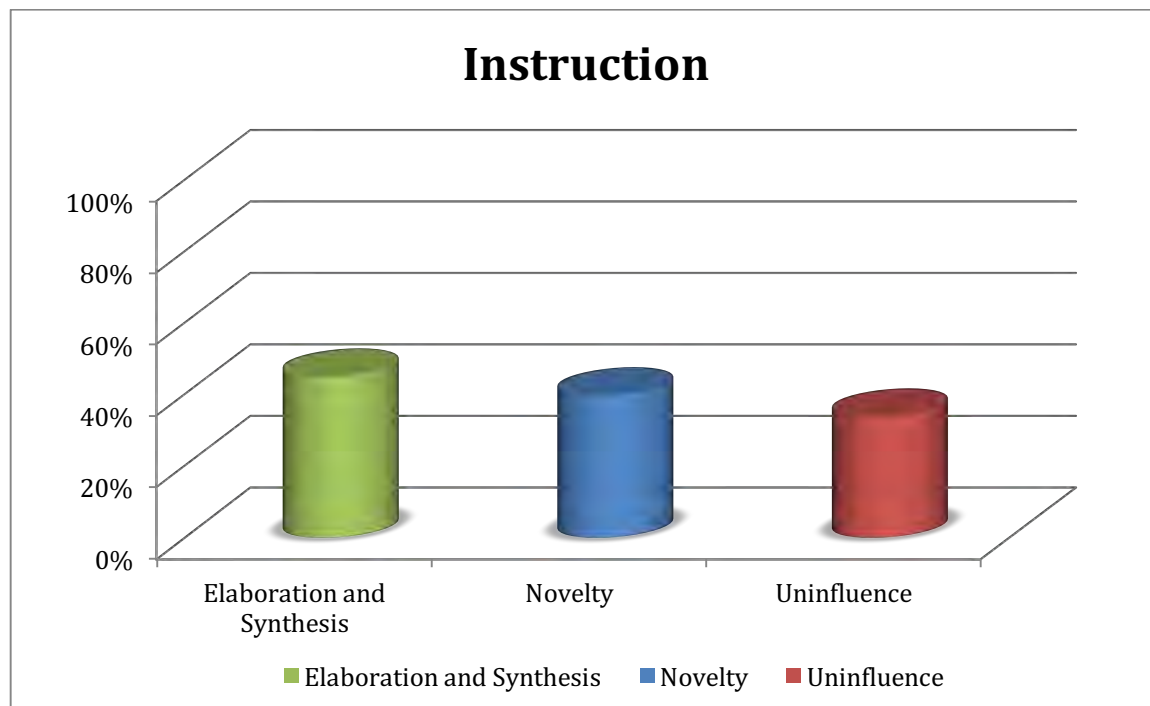
**Source: Researcher's survey**

## Instruction (Experiment 2)

The main purpose of experiment three was to investigate the influence that the variable of instruction has on creativity. Therefore, engagement and evaluation were excluded in this experiment.

The overall score for creativity was 42 percent, comprised of 45 percent for Elaboration and Synthesis and 40 percent for Novelty. The overall score for Uninfluenced was at 34 percent Figure 11.

**Figure 11: Instruction**



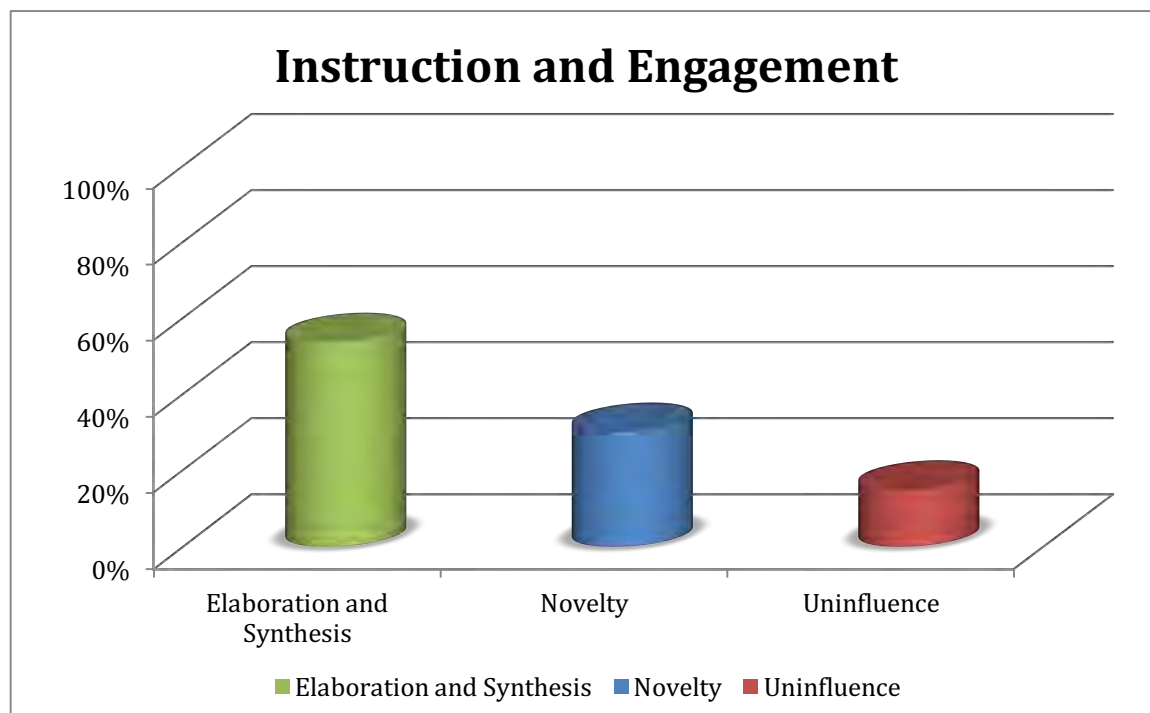
**Source: Researcher's survey**

## Instruction and Engagement (Experiment 3)

Experiment 3 included the variables of instruction and engagement but excluded the variable of evaluation.

The results showed that there was an overall creativity score of 42 percent, comprised of 54 percent score for Elaboration and Synthesis and 30 percent for novelty. The overall score for Uninfluenced was 15 percent Figure 12.

**Figure 12: Instruction and Engagement**



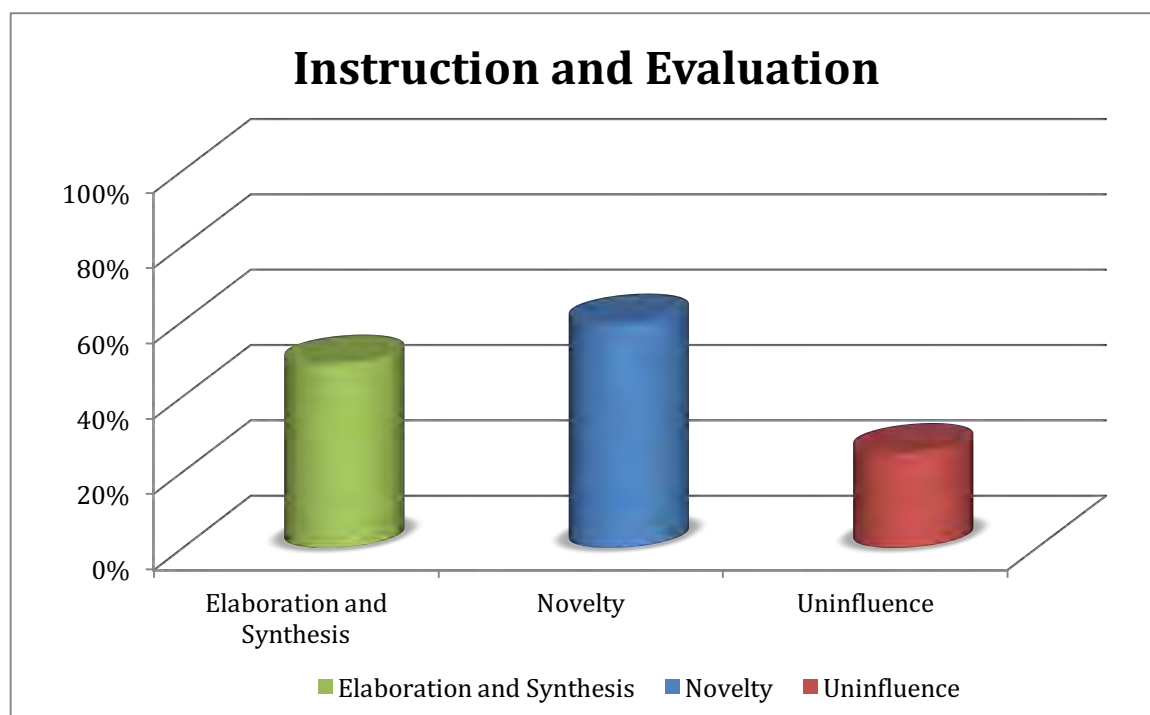
**Source: Researcher's survey**

## Instruction and Evaluation (Experiment 4)

Experiment 4 involved the children designing under the variables of instruction and evaluation and excluded the variable of engagement.

The results revealed that the creativity score for Elaboration and Synthesis was 49 percent and the creativity score for Novelty was 60 percent, the overall score for creativity was 54 percent. The overall score for Uninfluenced was 25 percent Figure 13.

**Figure 13: Instruction and Evaluation**



**Source: Researcher's survey**

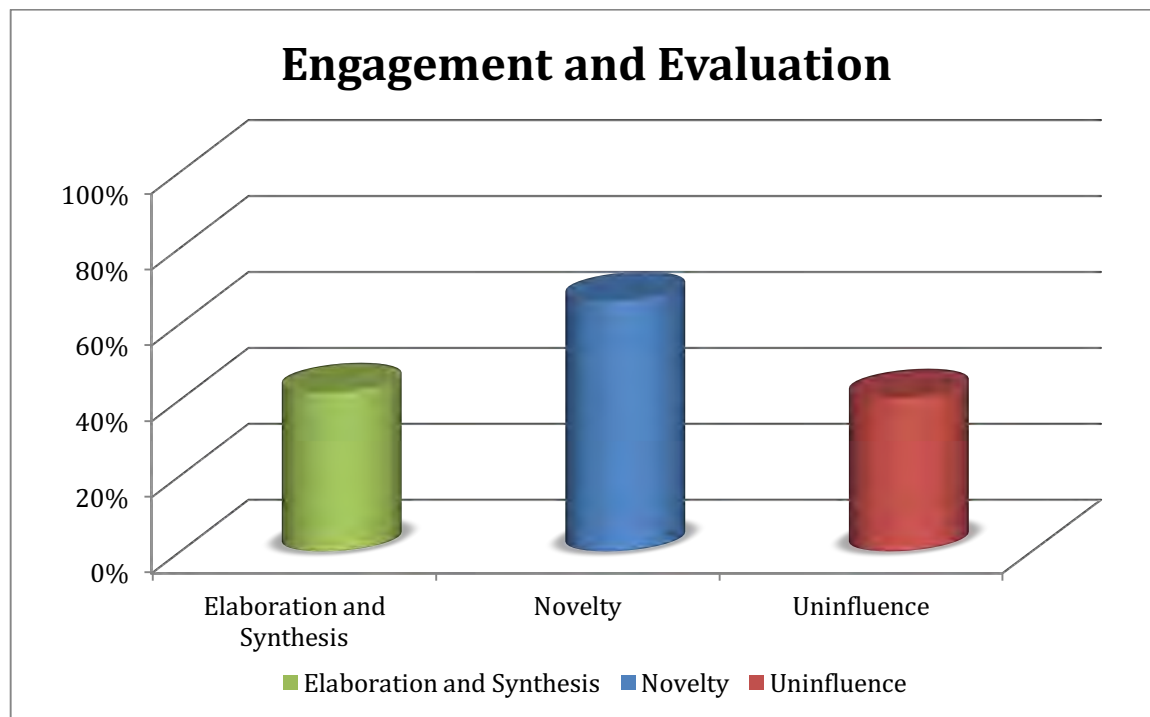


## Engagement and Evaluation (Experiment 5)

Experience 5 excluded the variable of instruction, this was achieved through having only absolute minimal instruction as was necessary, engagement and evaluation were included.

The overall creativity score was 54 percent, this score was comprised of an overall creativity score for Elaboration and Synthesis of 42 percent and Novelty at 66 percent. The overall score for Uninfluenced was 40 percent Figure 14.

**Figure 14: Engagement and Evaluation**



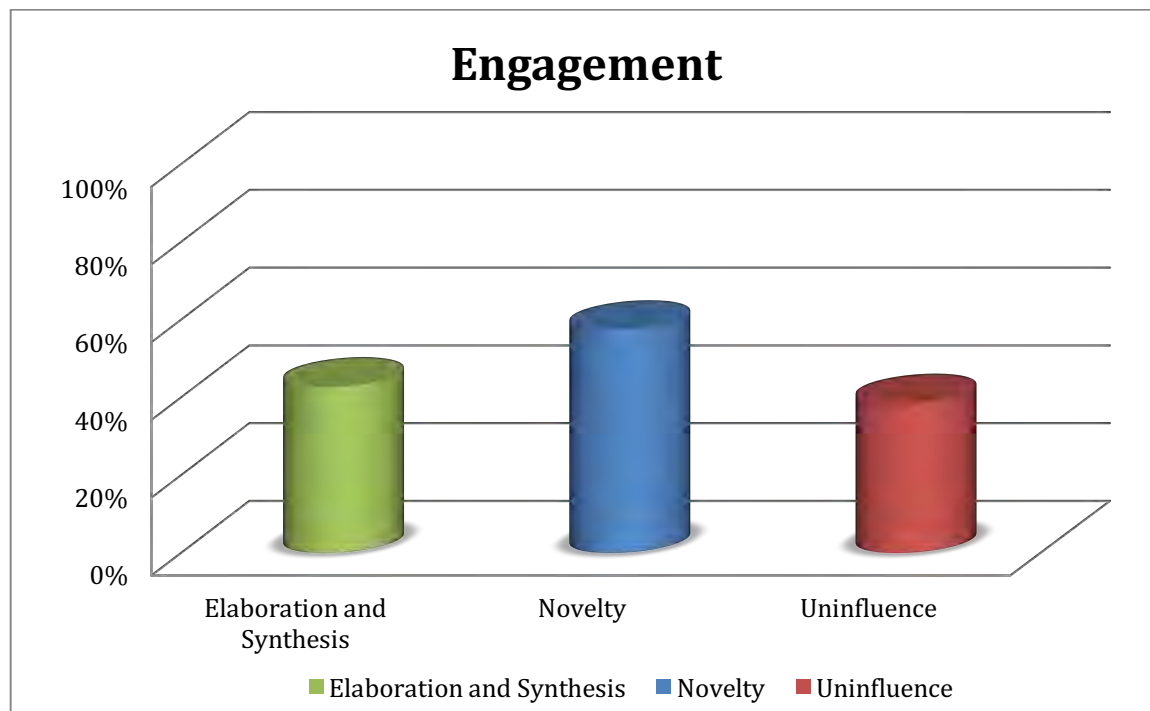
**Source: Researcher's survey**

## Engagement (Experiment 6)

Experiment 6 excluded the variables of Instruction and Evaluation and only included Engagement.

The overall creativity score was 50 percent, this overall score was comprised of an overall score for Elaboration and Synthesis of 43 percent and a Novelty score of 57 percent. The overall score for Uninfluenced was 39 percent Figure 15.

**Figure 15: Engagement**



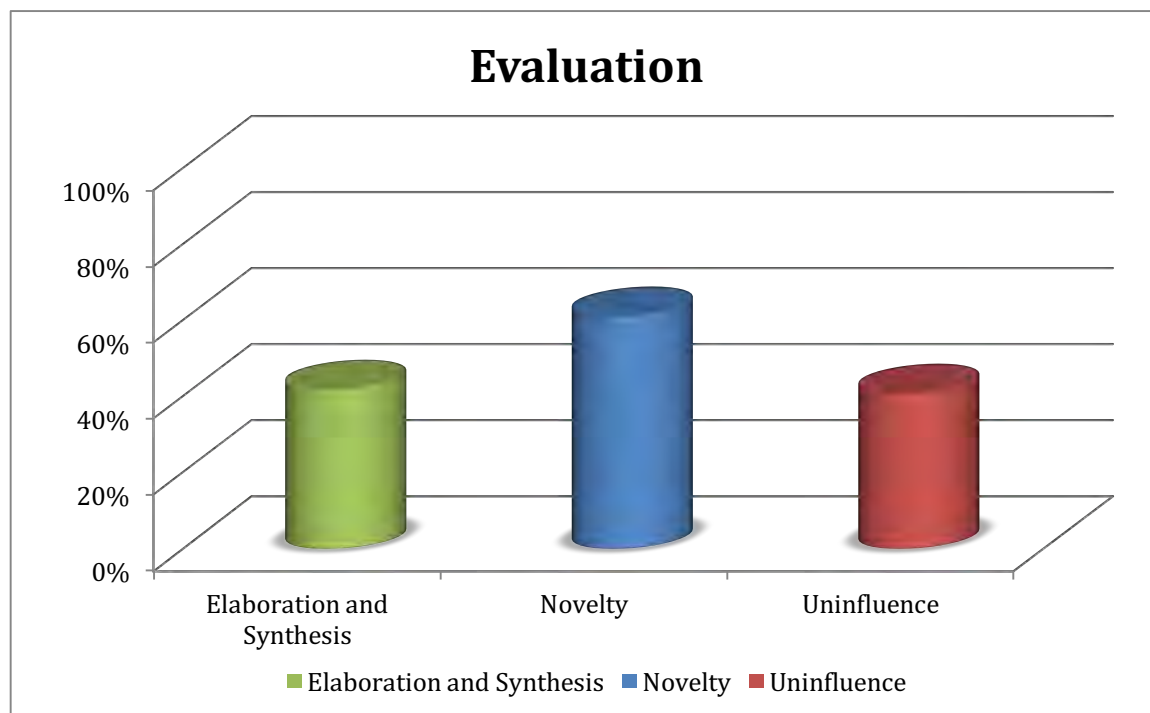
**Source: Researcher's survey**

## Evaluation (Experiment 7)

Experiment 7 only included the variable of evaluation and excluded the instruction and engagement variables.

The overall score for Elaboration and Synthesis was 42 percent and for Novelty it was 61 percent, this provided an overall score for creativity of 51 percent. The overall score for Influence was 41 percent Figure 16.

**Figure 16: Evaluation**



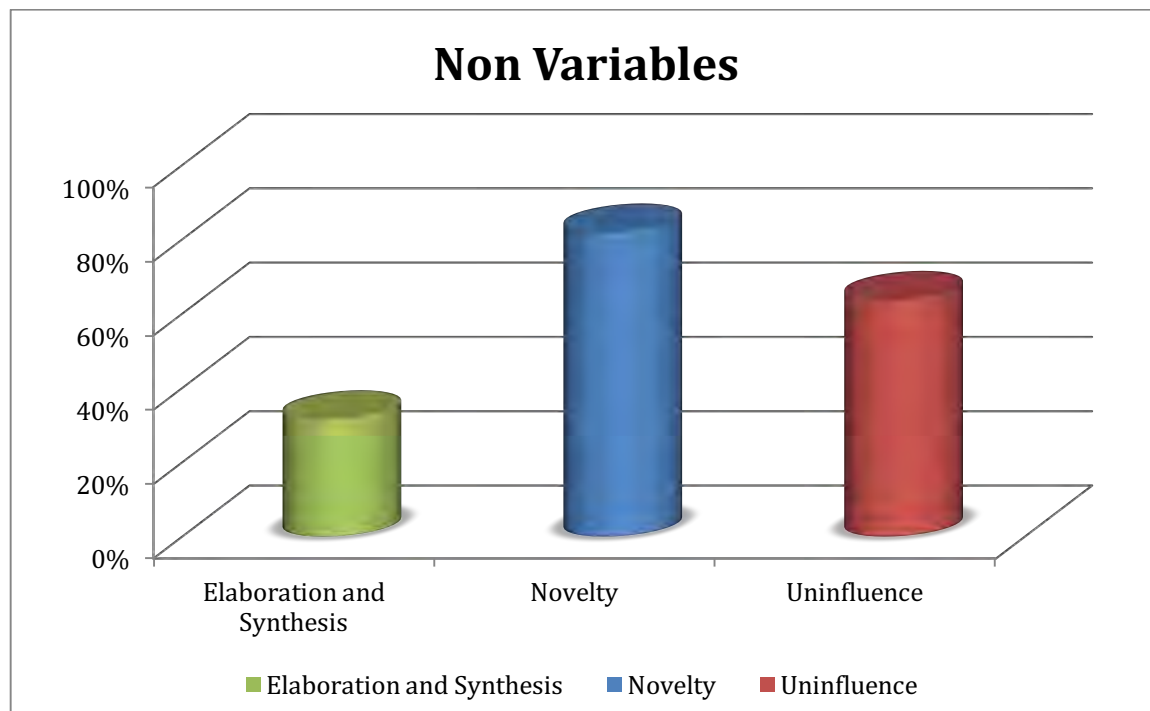
**Source: Researcher's survey**

## Non Variables (Experiment 8)

Experiment 8 excluded all the three variables of instruction, engagement and evaluation and without completely involve of an adult.

The overall score for Elaboration and Synthesis was 32 percent and for Novelty it was 82 percent, this provided an overall score for creativity of 57 percent. The overall score for Influence was 64 percent Figure 17.

**Figure 17: Non Variables**



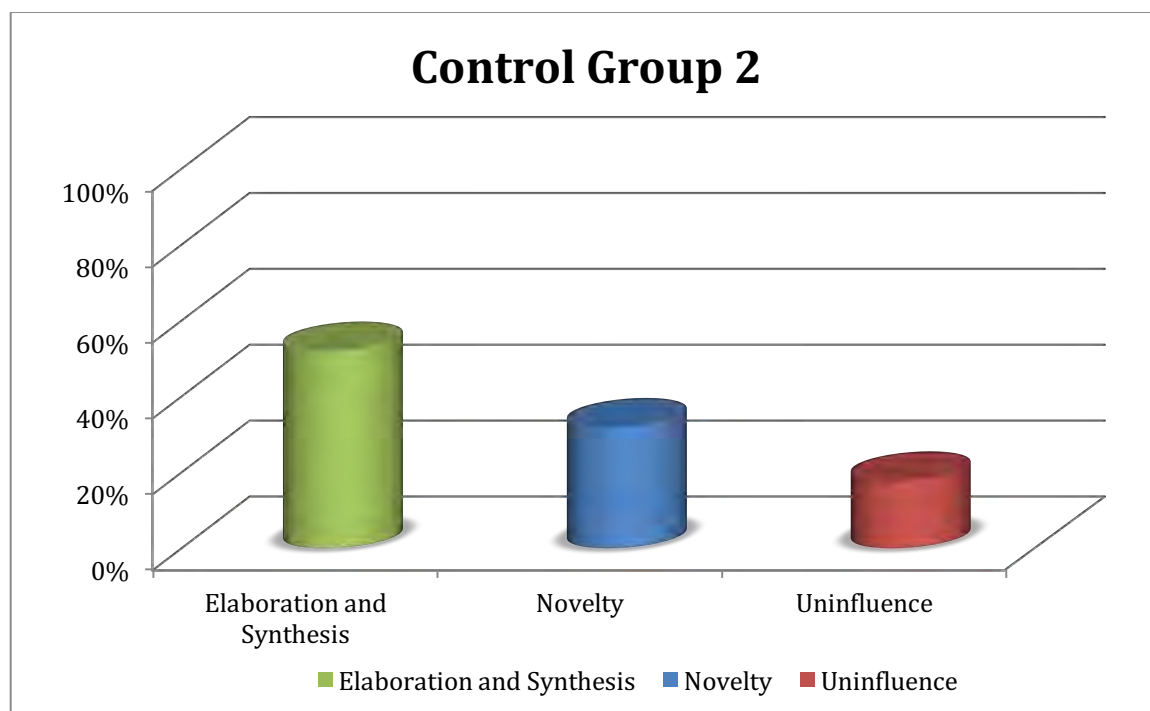
**Source: Researcher's survey**

## Control Group 2 (Experiment 9)

Experiment 9 was a control experiment that was exactly the same as Experiment 1 explained in the above. This experiment included all variables, instruction, engagement and evaluation. The reason it was the same as Experiment 1 was because it was designed to see if participating in the intervening experiments (experiments 2,3,4,5,6,7,8) had an effect on the children's creativity as well as evidence of influence. The results of experiment 1 are compared to the results of Experiment 9.

The overall creativity score for Experiment 9 was 42 percent; this was comprised of a score for Elaboration and Synthesis of 52 percent and a score for Novelty at 32 percent. The overall score for Uninfluenced was 18 percent Figure 18.

**Figure 18: Control Group 2**



**Source: Researcher's survey**

## Experiment Procedure

To achieve the aims of the study, the procedure of the experiments should achieve a reflection of a normal art class that takes place in the school. To achieve repeatability, the experiment procedure is established here for other researchers to repeat the experiments. Specifically, the procedure involves the sampling, the design brief where the inclusion of instruction is tested for, the duration of the experiments, reflective of a normal class, and the evaluation tool and procedures required to evaluate children's drawing.

The procedure here also includes the experiment structure which shows which experiments relate to which variables are being tested for (see table below)

Experiments	Control / Variable	Involvement of Adults (Variables)		
		INSTRUCTION	ENGAGEMENT	EVALUATION
Experiment 1	Control 1	✓	✓	✓
Experiment 2	Variable 1	✓	✗	✗
Experiment 3	Variable 1+2	✓	✓	✗
Experiment 4	Variable 1+3	✓	✗	✓
Experiment 5	Variable 2+3	Minimal	✓	✓
Experiment 6	Variable 2	Minimal	✓	✗
Experiment 7	Variable 3	Minimal	✗	✓
Experiment 8	No Variables	Minimal	✗	✗
Experiment 9	Control 2	✓	✓	✓

## **Sampling**

The study sample for the child participants comprised of a total of 18 male primary school children of 12 years of age, year 6 in Saudi Arabia. They were sampled from one school in the Mecca region. There were a total of nine experiments using the same children, producing a total of 162 drawing samples.

## **Design Brief**

In the main experiments instruction is tested for as a variable in experiment 2 where it is tested alone, experiment 3 where it is tested in combination with engagement and with evaluation in experiment 4. Each of these experiments where instruction is included as a variable a different design brief will be used. As mentioned in the above children will be briefed the same subjects in the experiments as they are normally briefed in the classroom as part of curriculum requirements. For experiments 2 and 3 the theme was architecture, specifically a mosque and architectural heritage respectively, experiment 4 included Islamic symmetrical art. For the control experiments, 1 and 9, the theme was the sea and children were asked to draw something from under the sea or on the sea. Experiments 5,6,7 and 8 did not include themes as instruction was not tested.

## **Duration**

The duration of the experiments will be 90 minutes because this is the duration of the normal art class. The questionnaire with the teachers addressed how the time was allocated in each session within this 90 minute timeframe, in terms of the time given for instruction, time for designing and working collaboratively with the teacher. The experiments test the variables according to the same structure of a normal class. There was one experiment per week for a period of 9 weeks.

## **Evaluation**

Based on the review of the tools for assessing creativity and in light of the advantages and disadvantages and the aims of the study it was decided to adopt CPSS. Due to the adoption of this tool, the designs will be assessed by non-experts, who will be art and design teachers using an adaptation of this widely adopted assessment method. There should be a total of three teachers who judged the work individually.

# **Outcomes of The Experiments**

## **Experiment 1**

Experiment 1 is the control experiment where all of the aspects of teacher involvement as variables are tested. The design brief in this experiment will be draw a sea.







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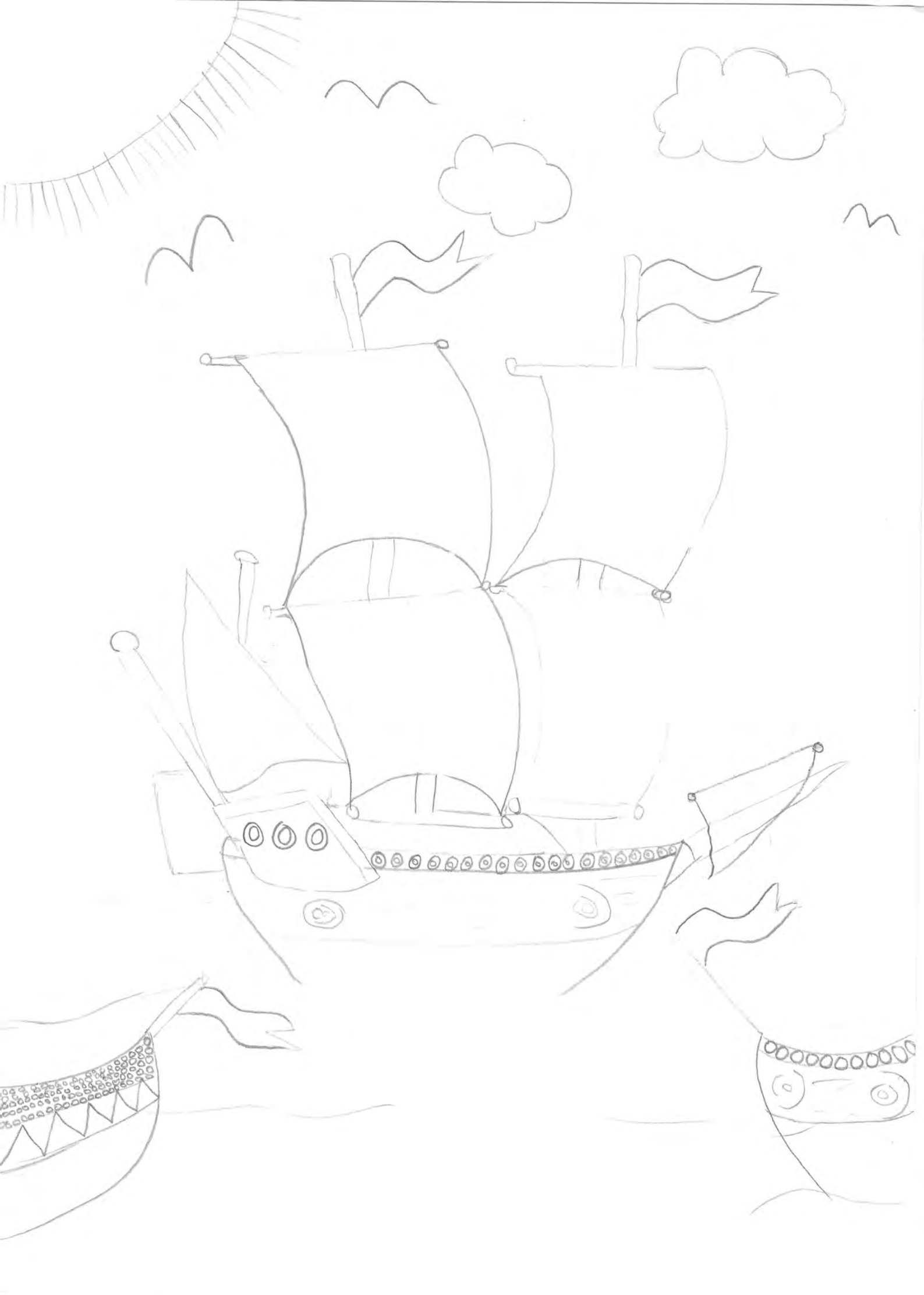


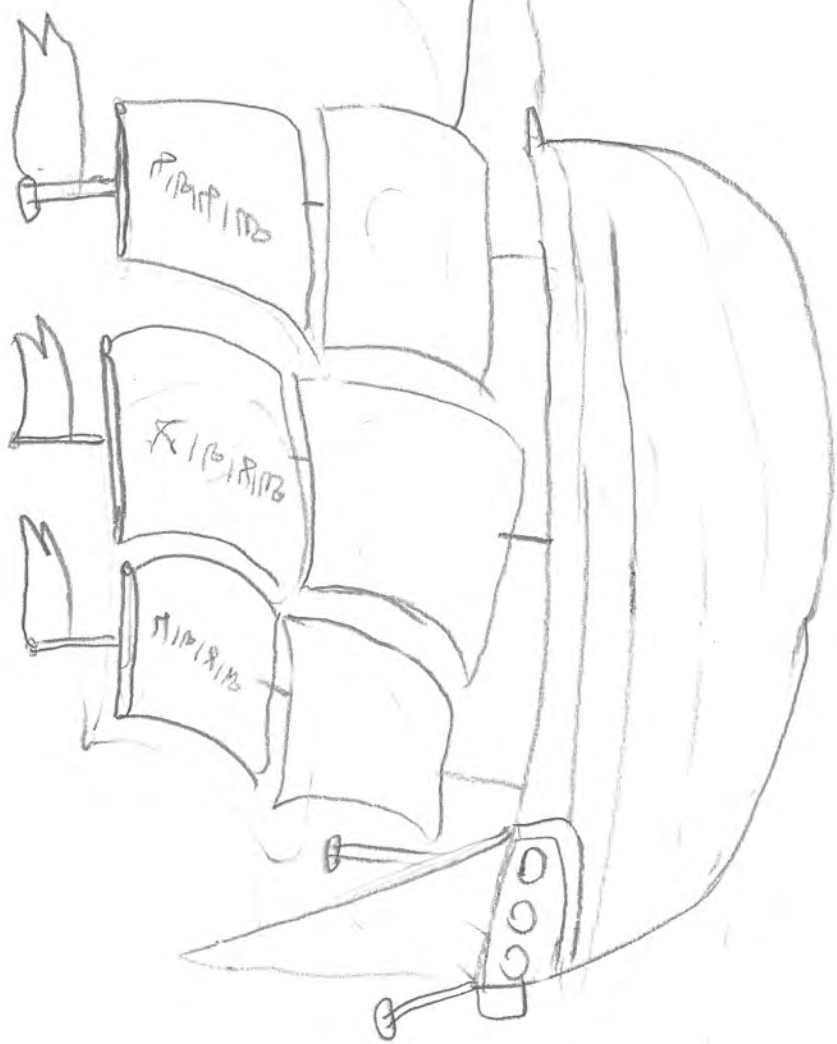




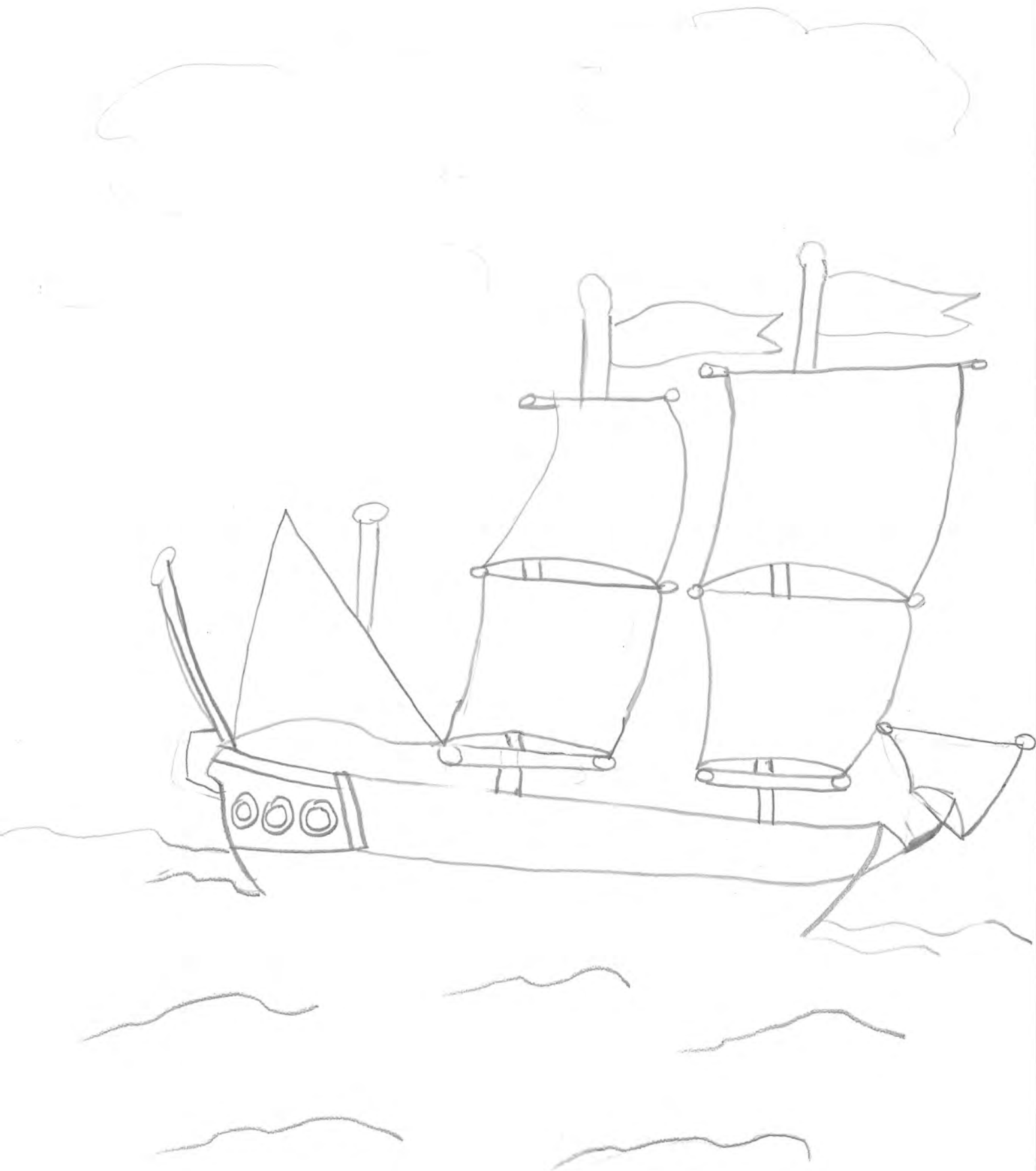


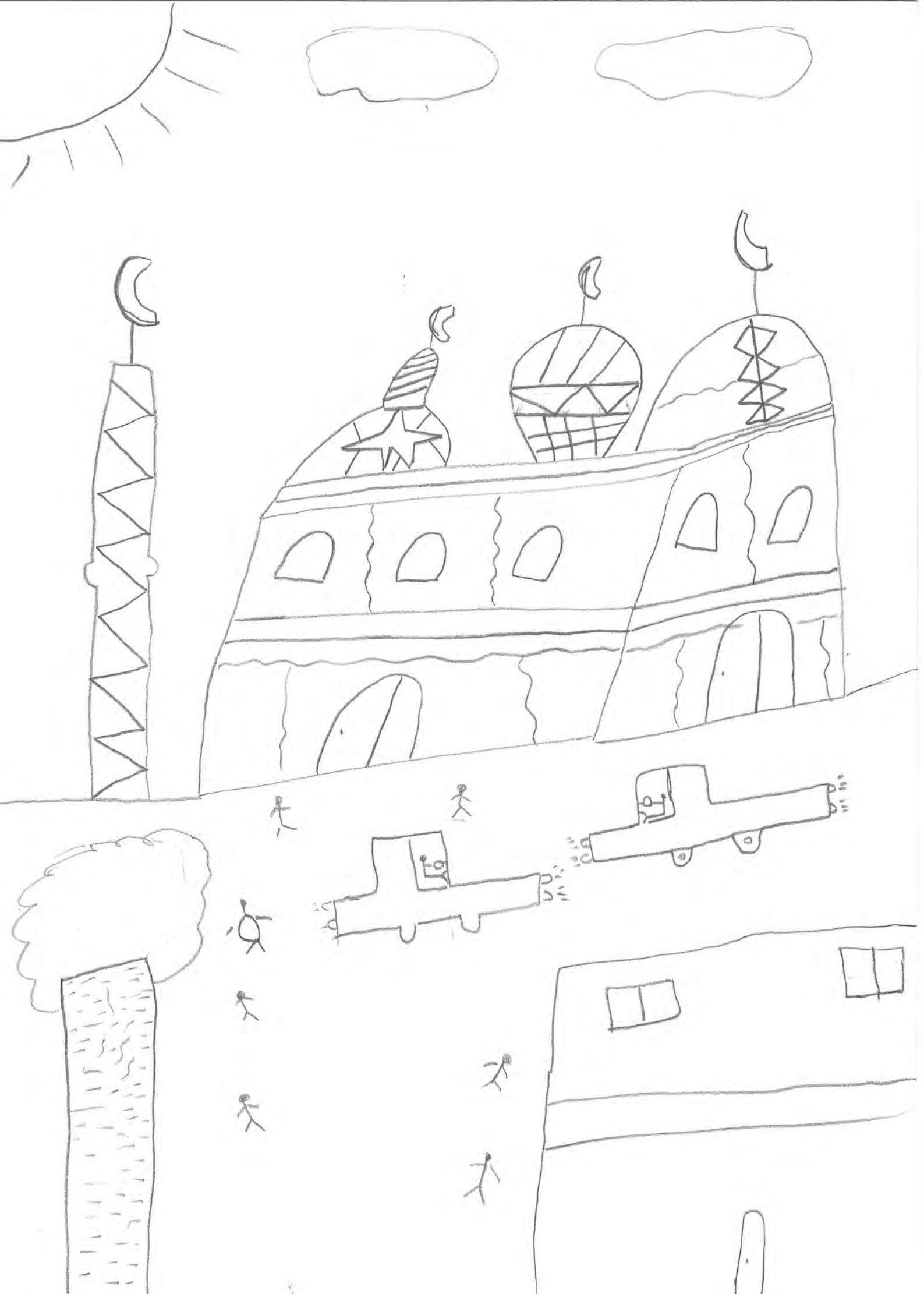




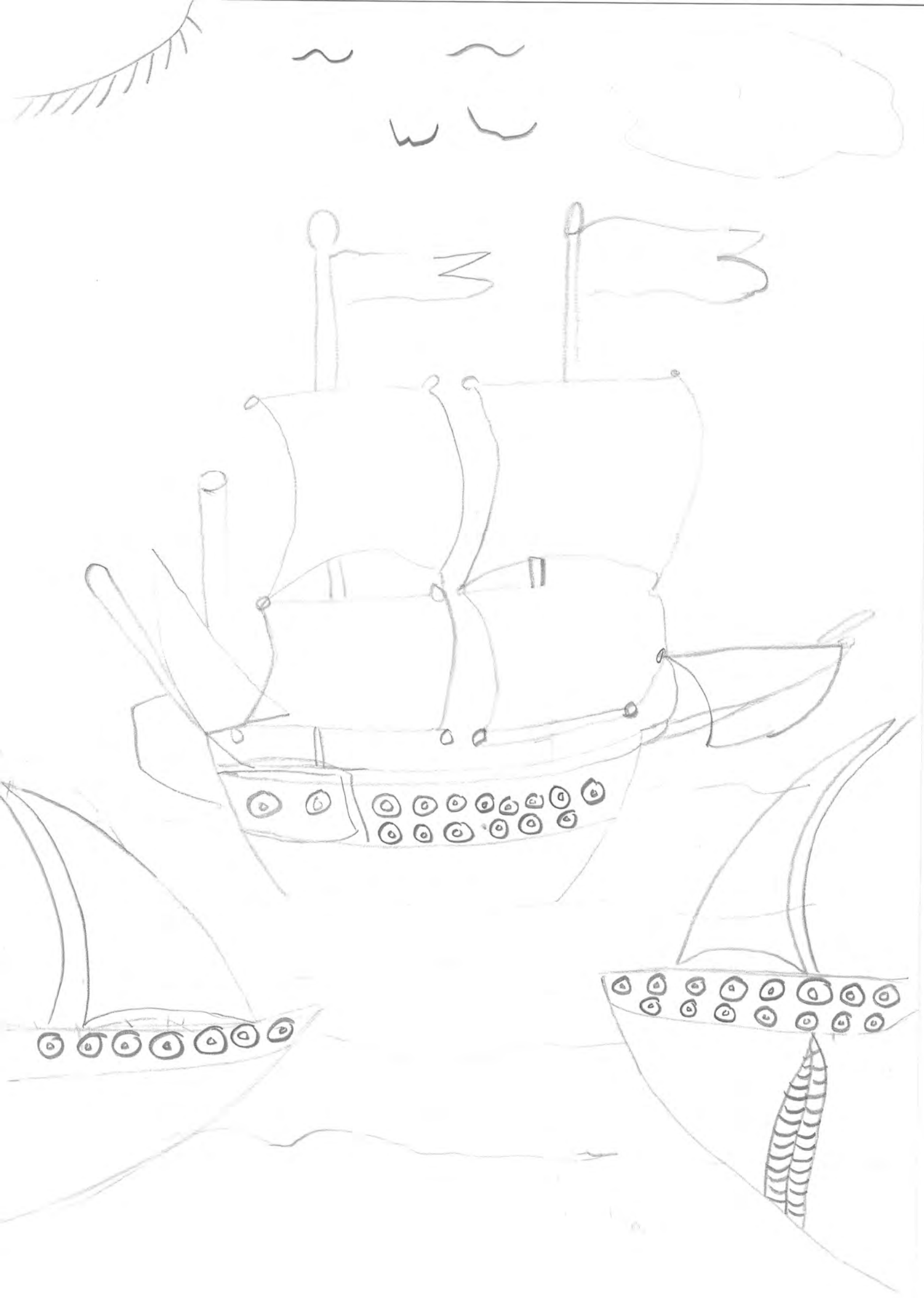


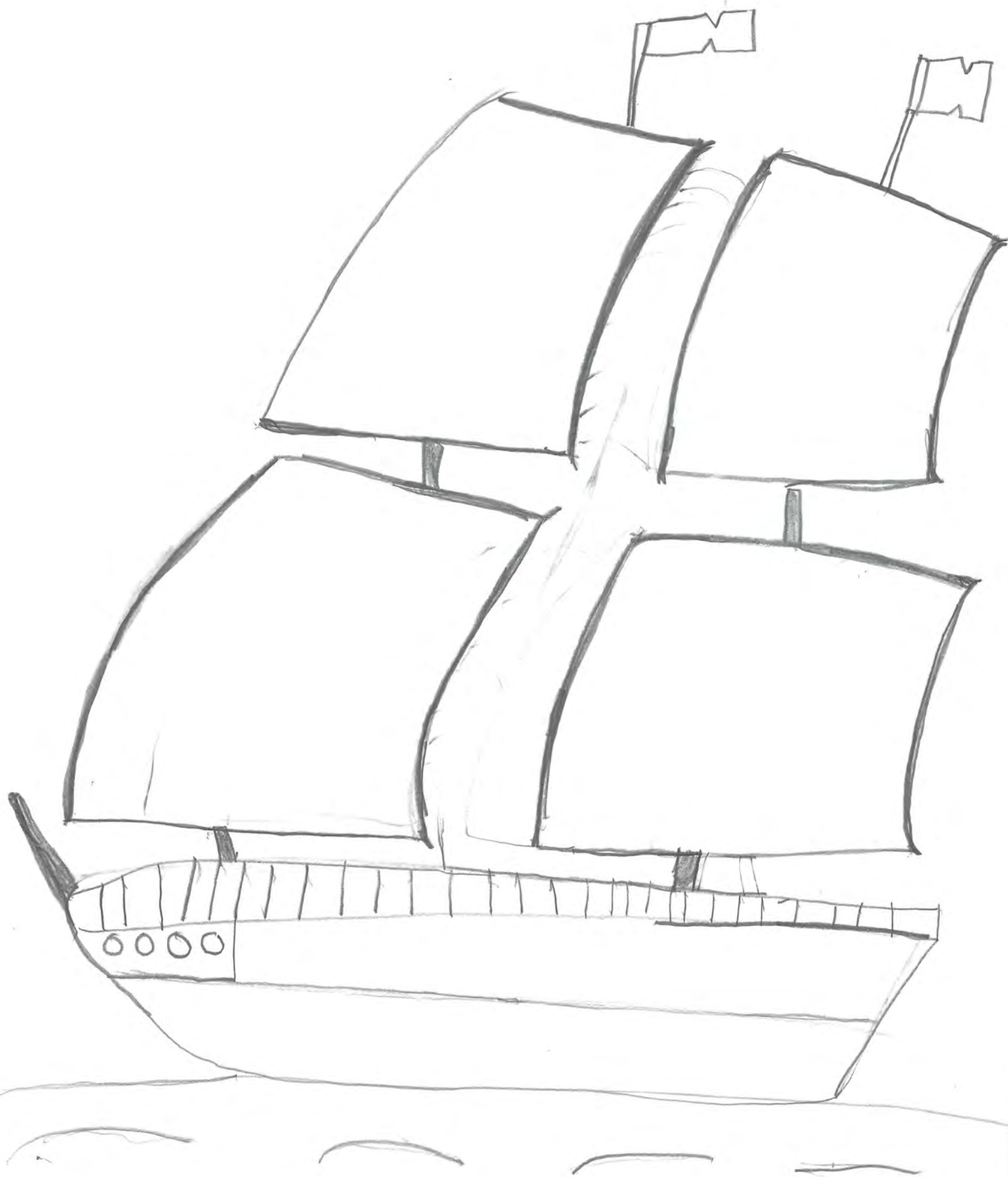


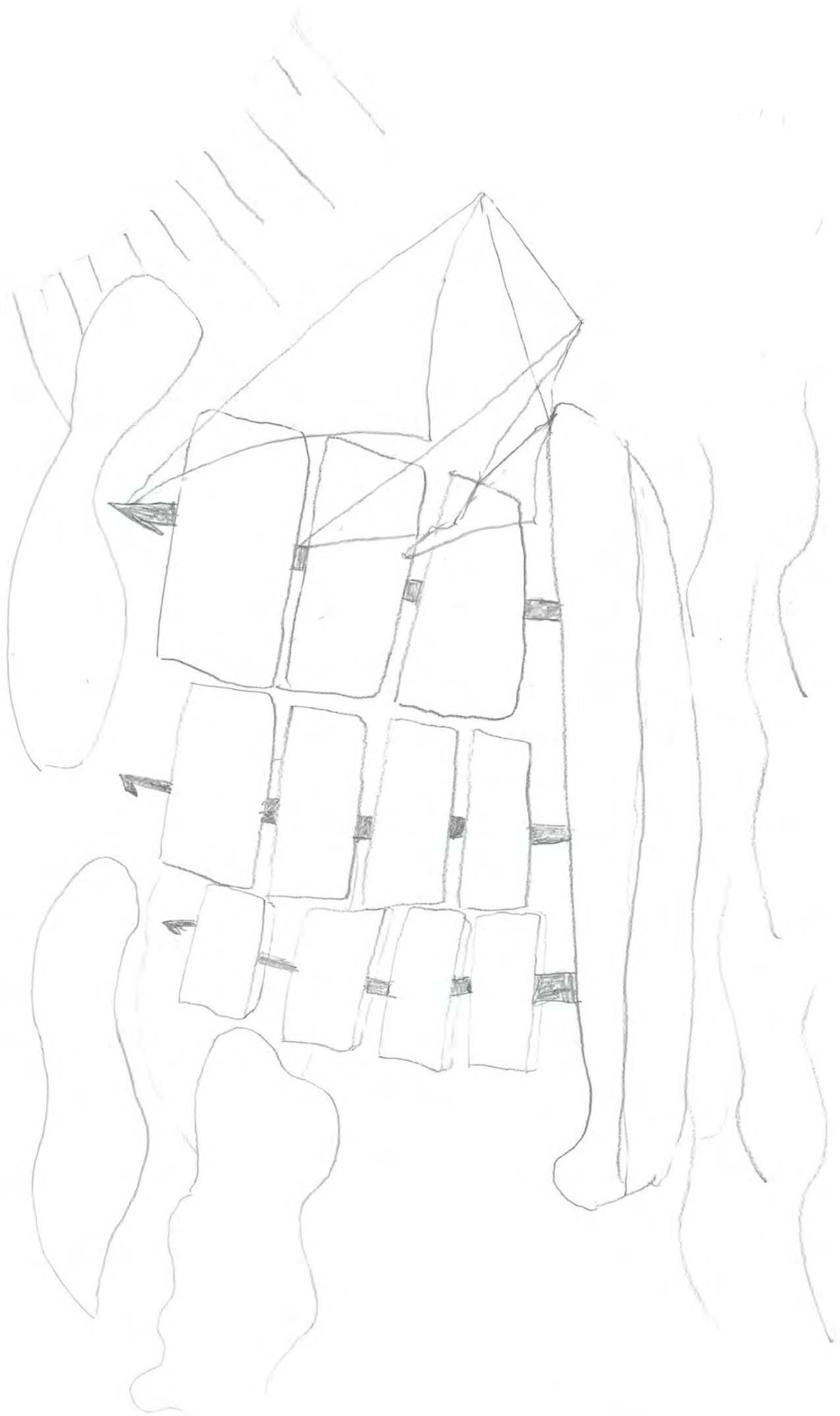


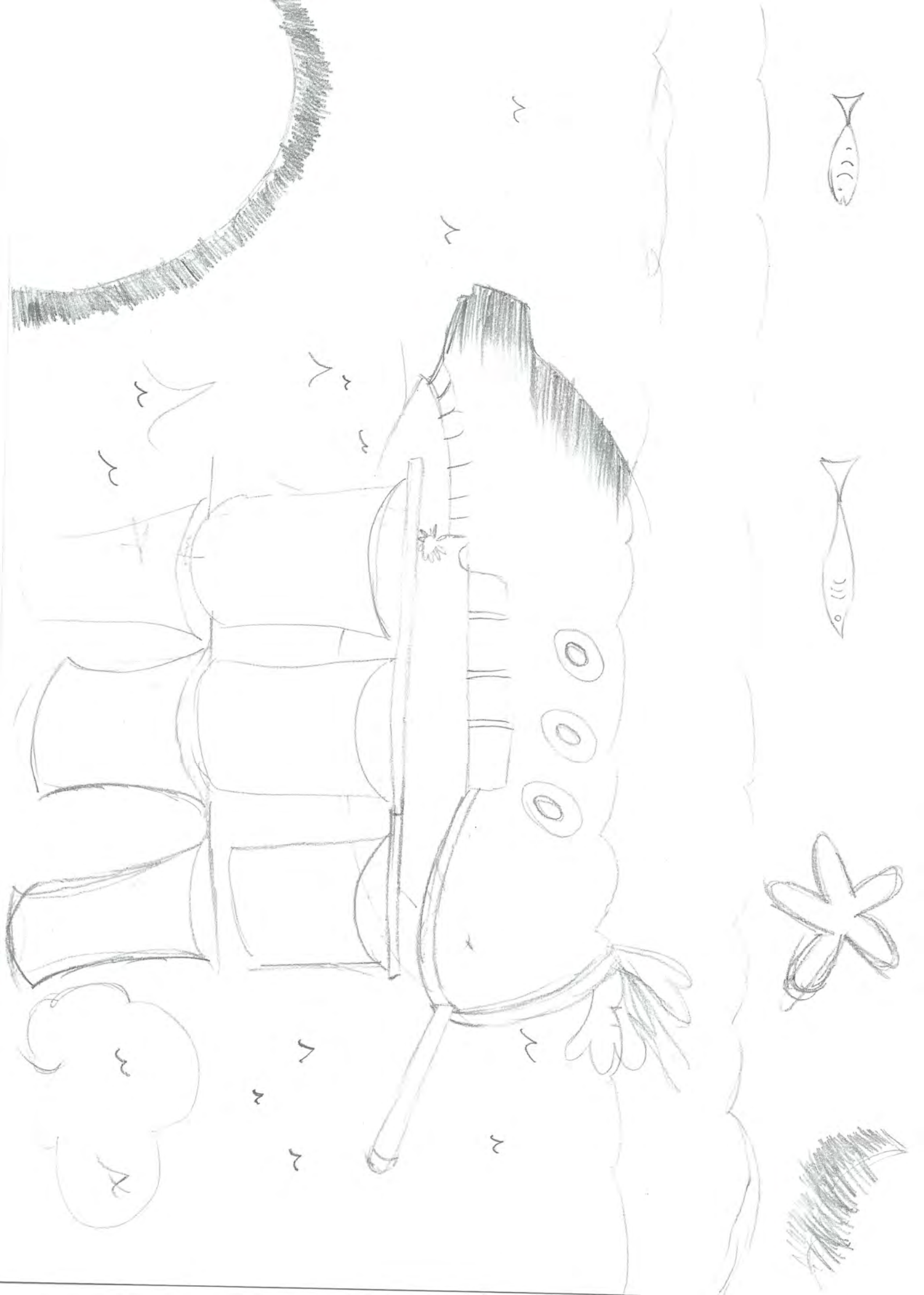






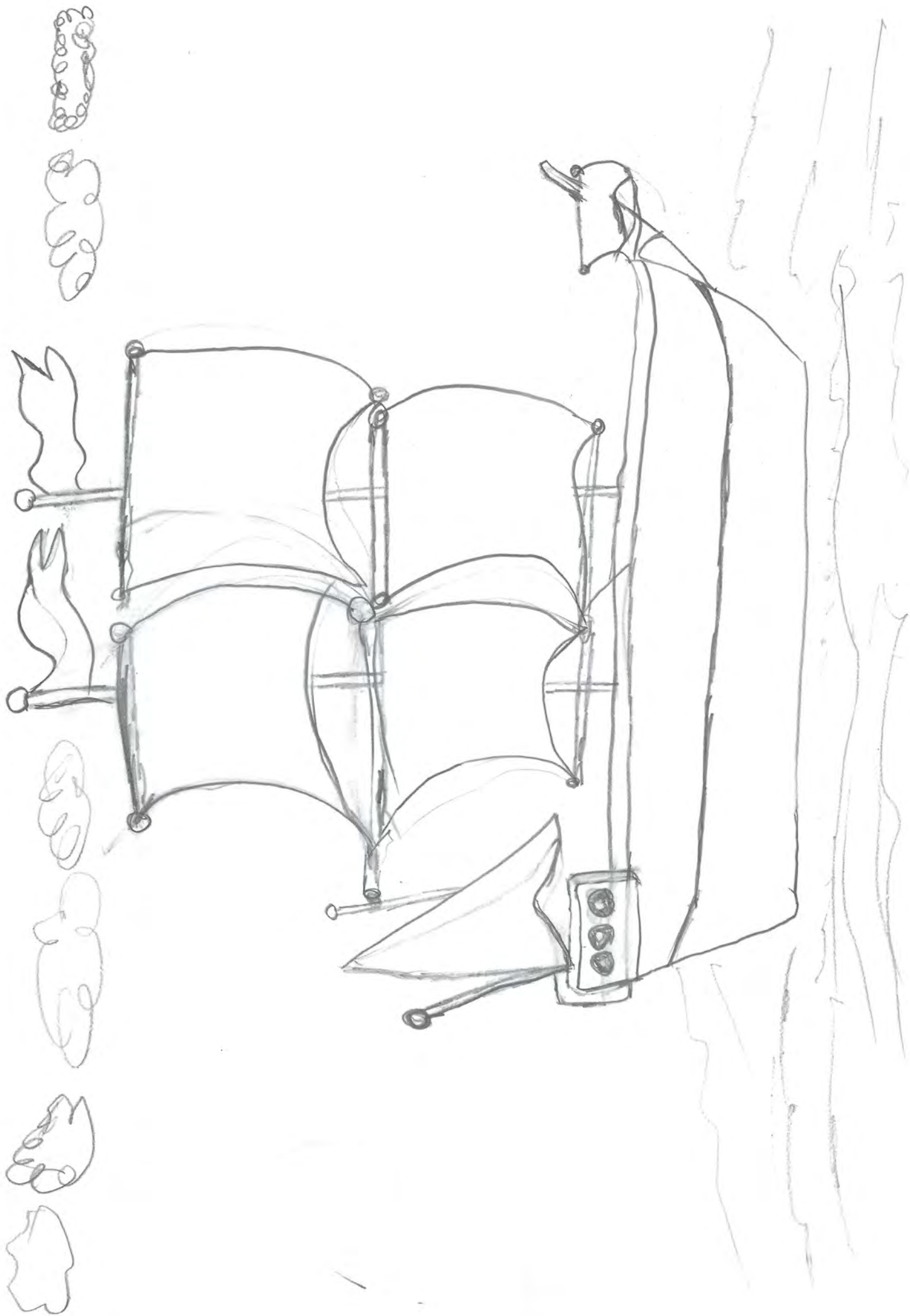


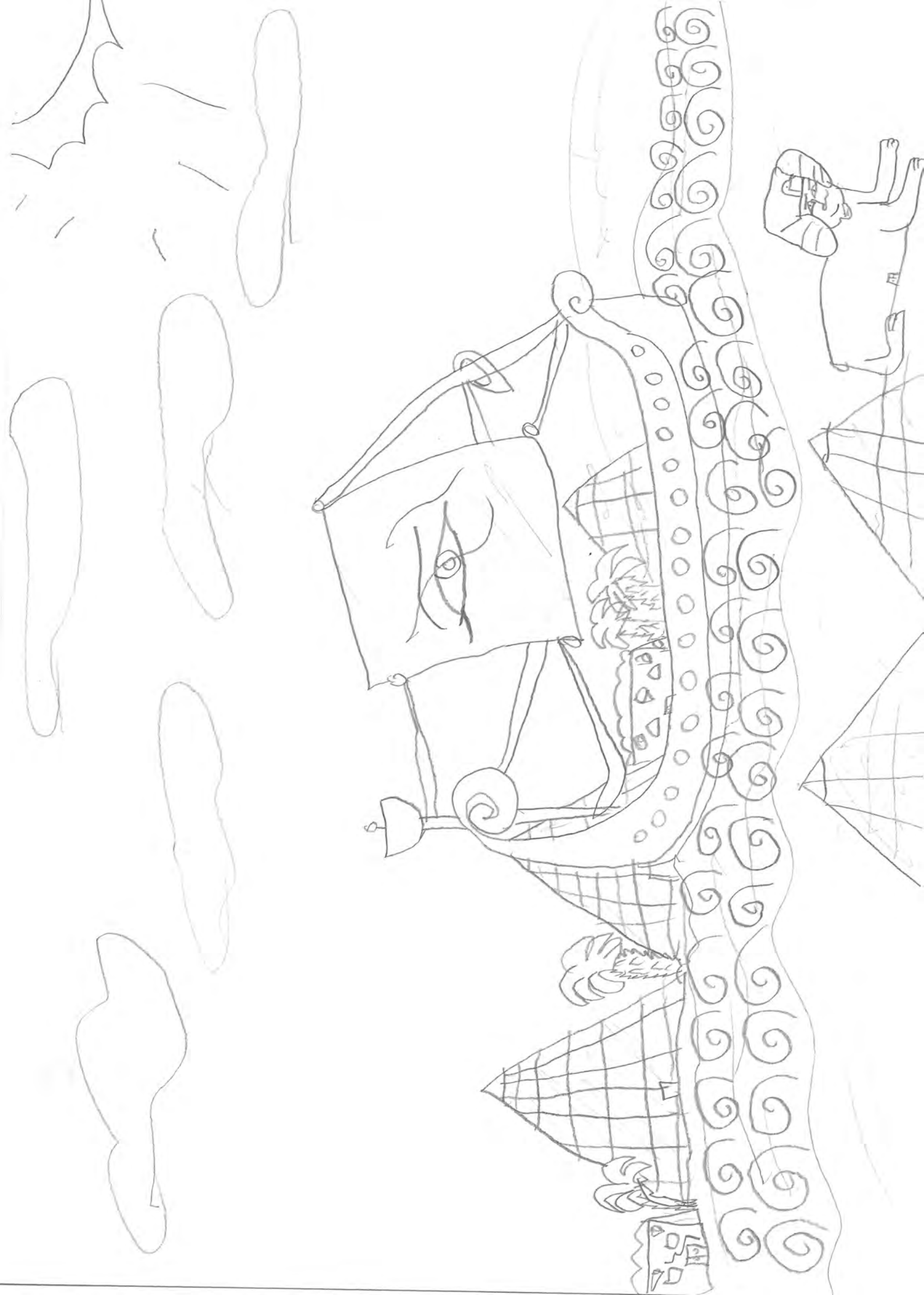






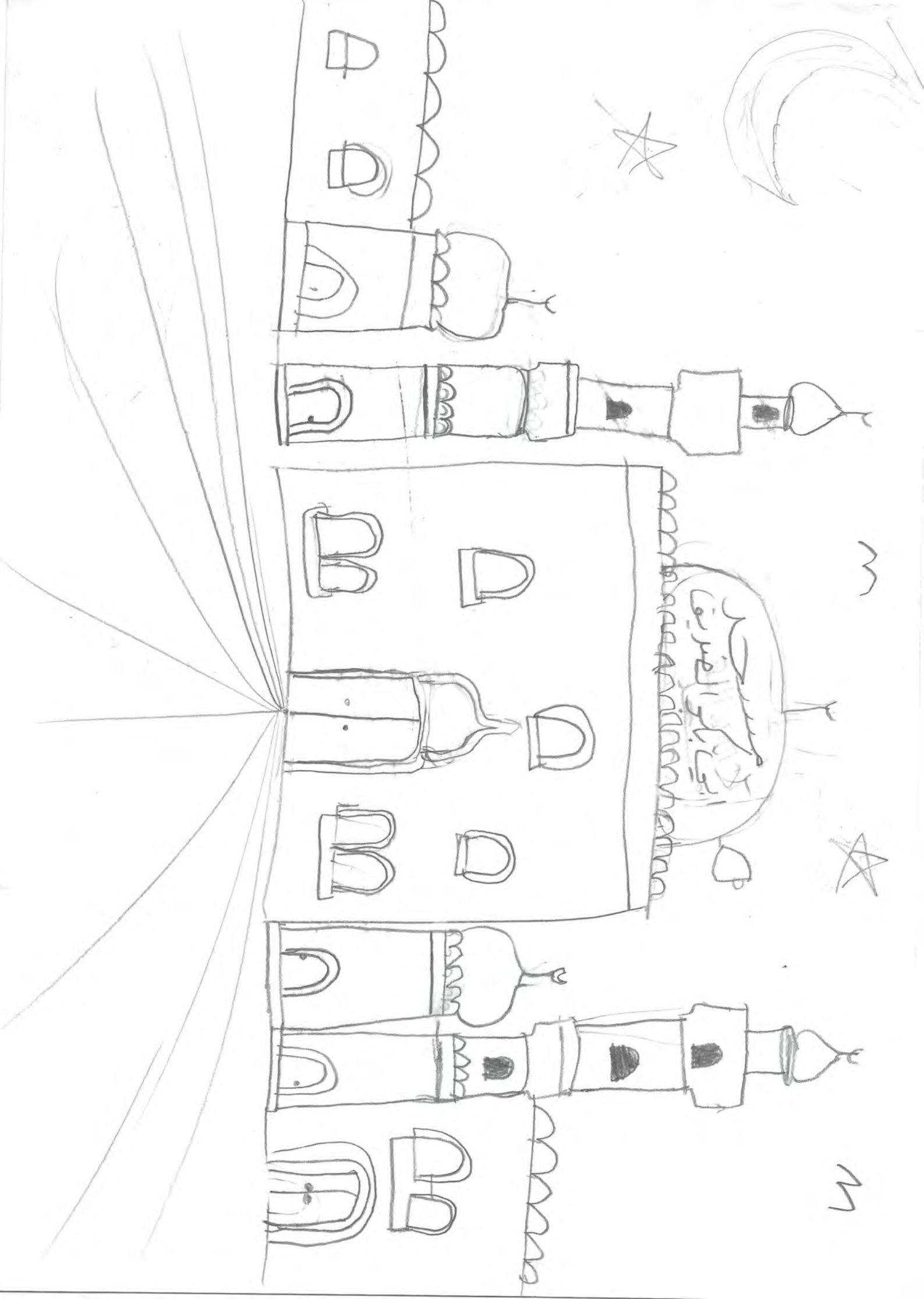




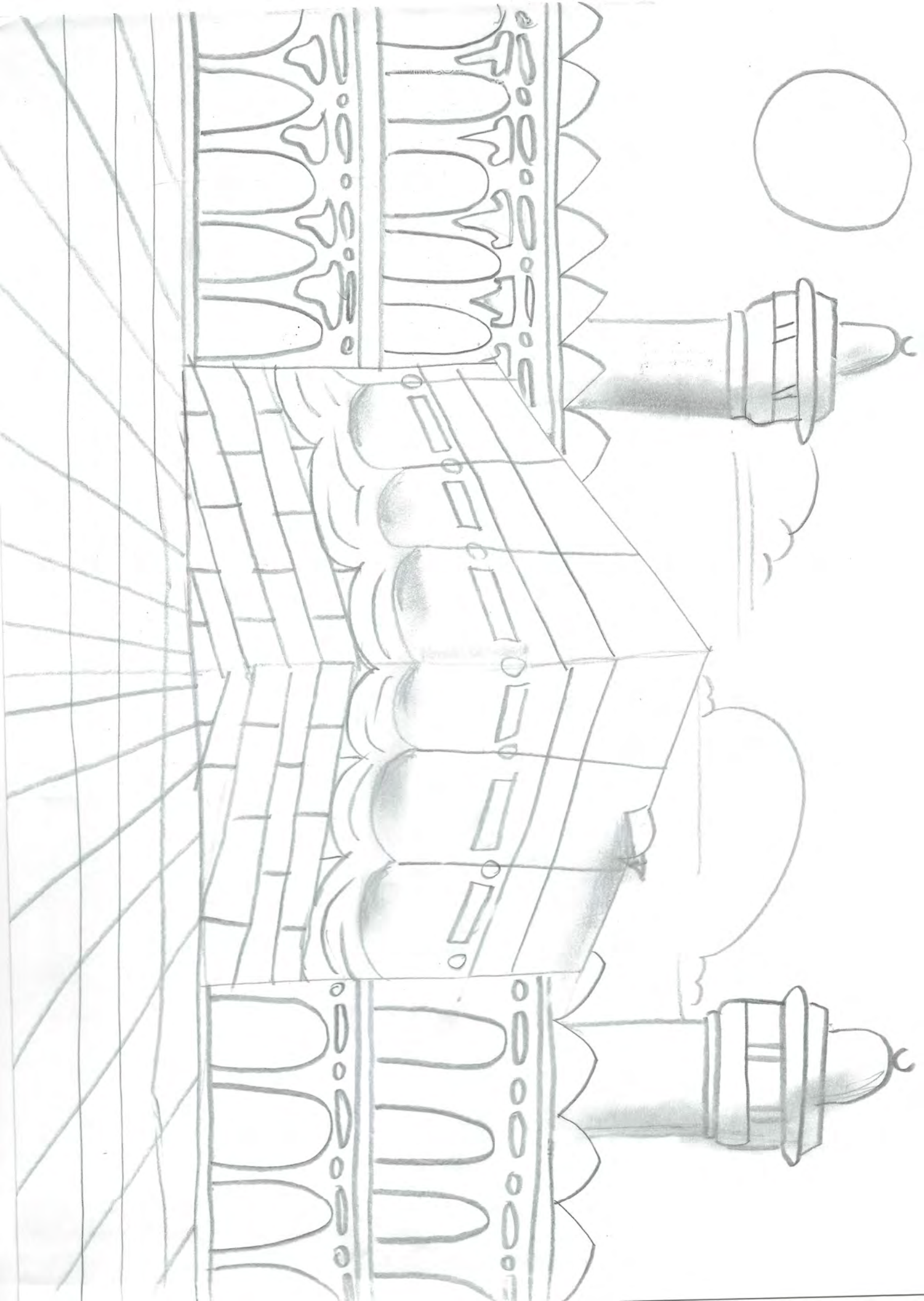


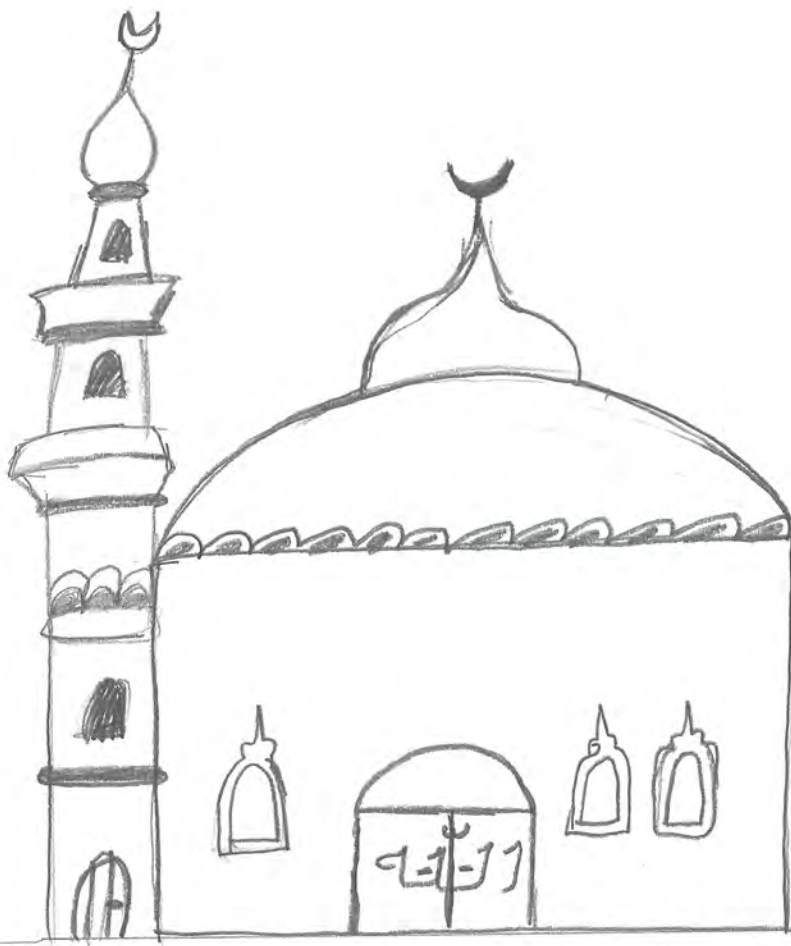
## **Experiment 2**

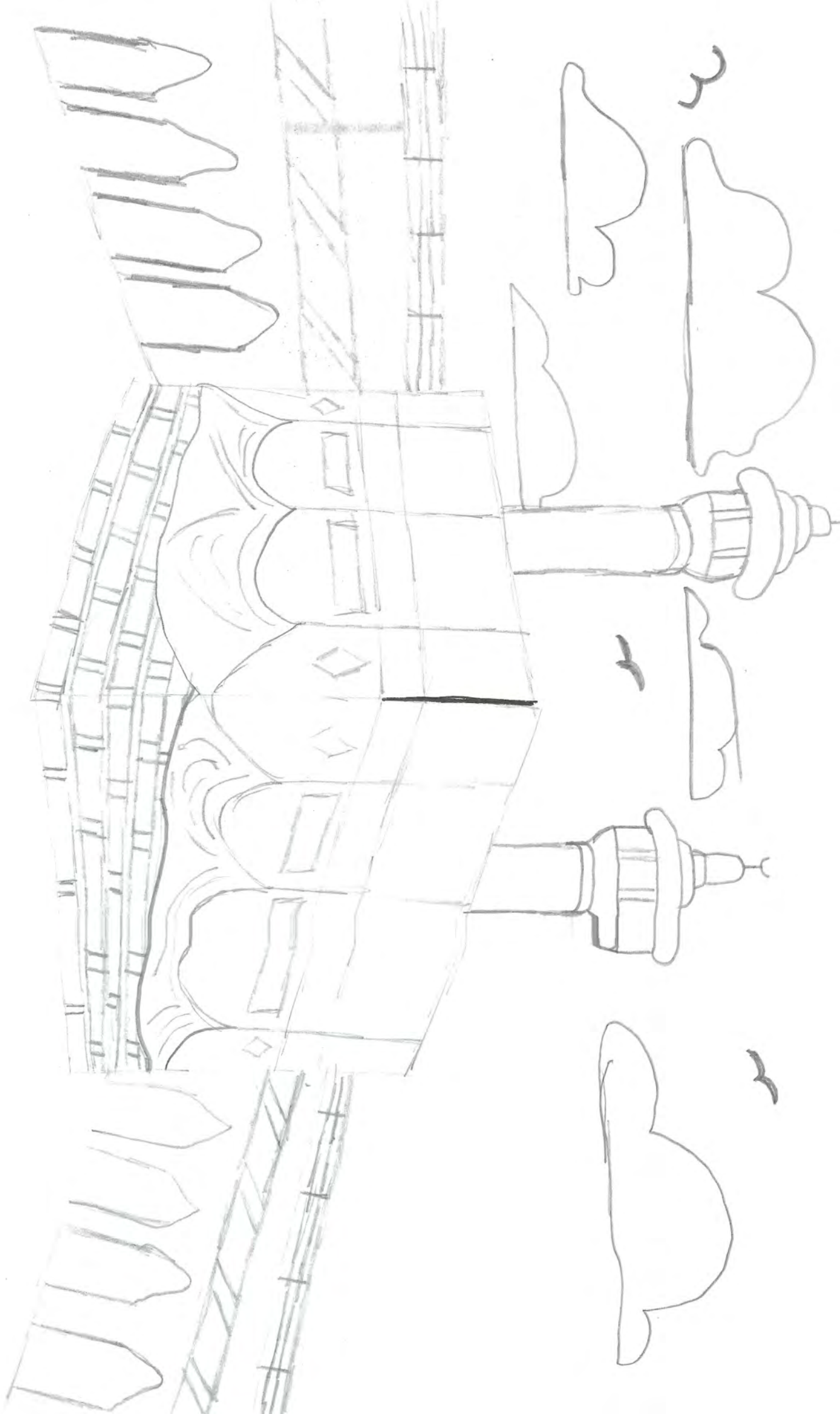
Experiment 2 is concerned with only testing instruction as one of the aspects of teacher involvement and excludes engagement and evaluation. The design brief in this experiment will be draw a mosque.

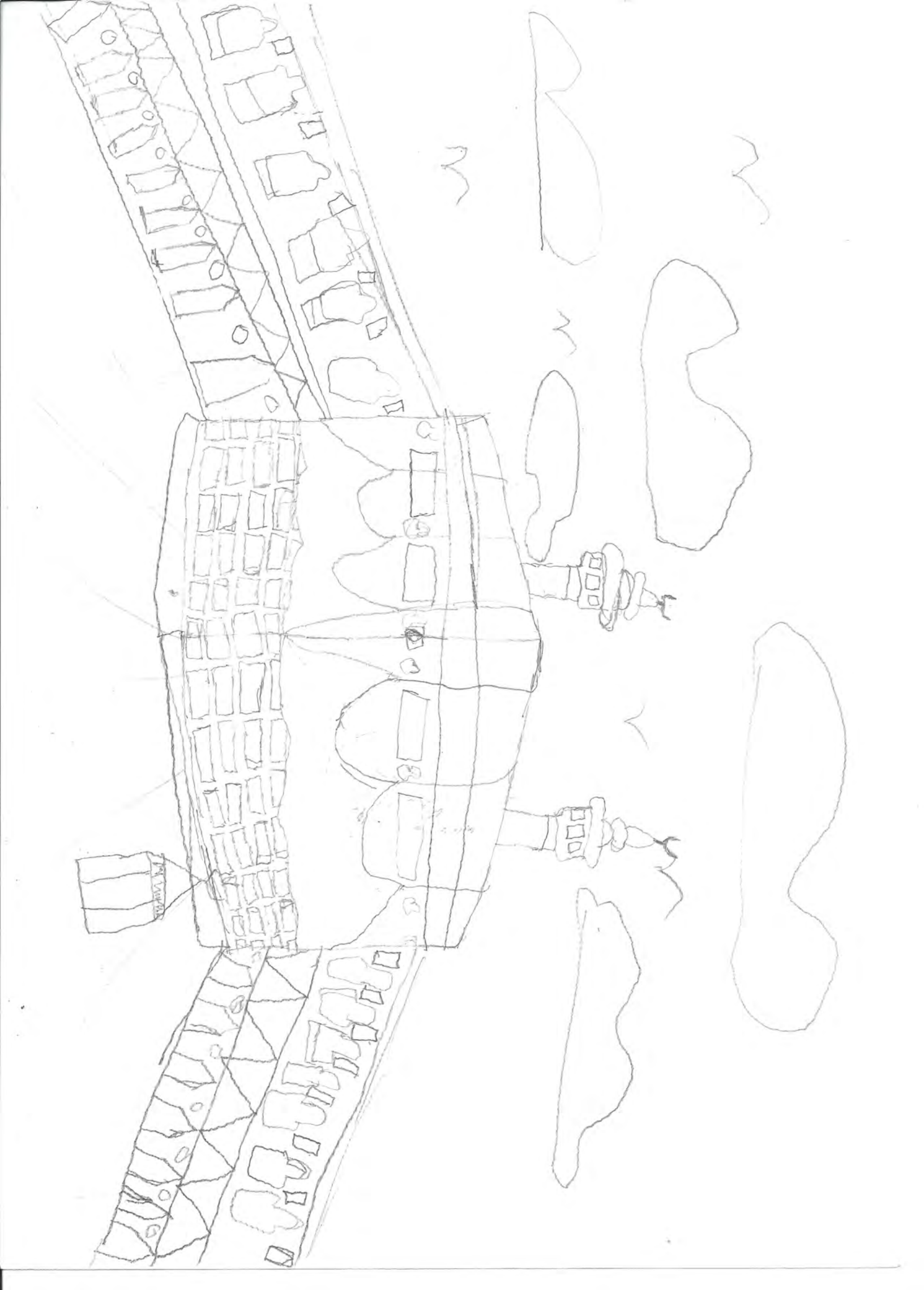




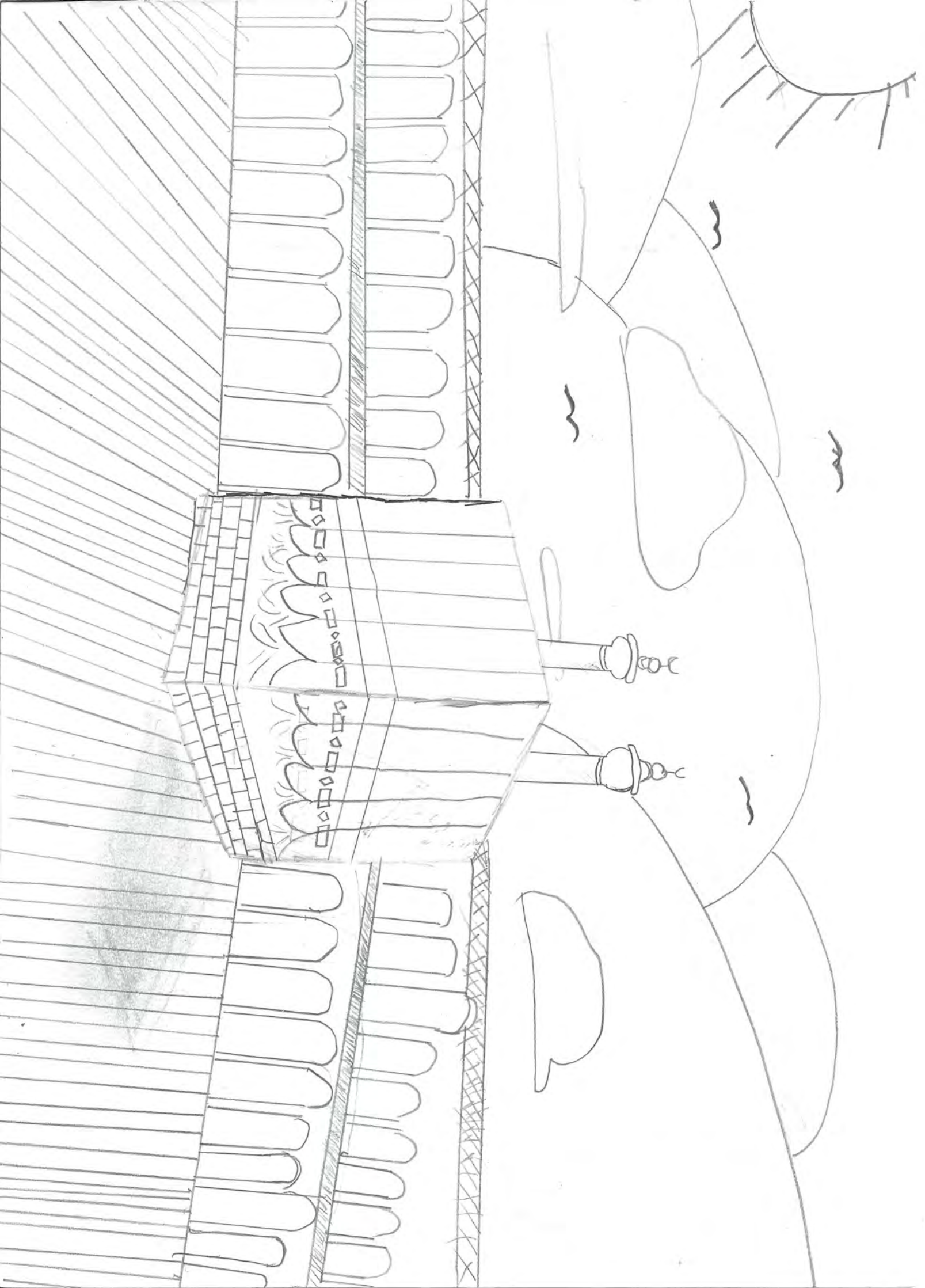


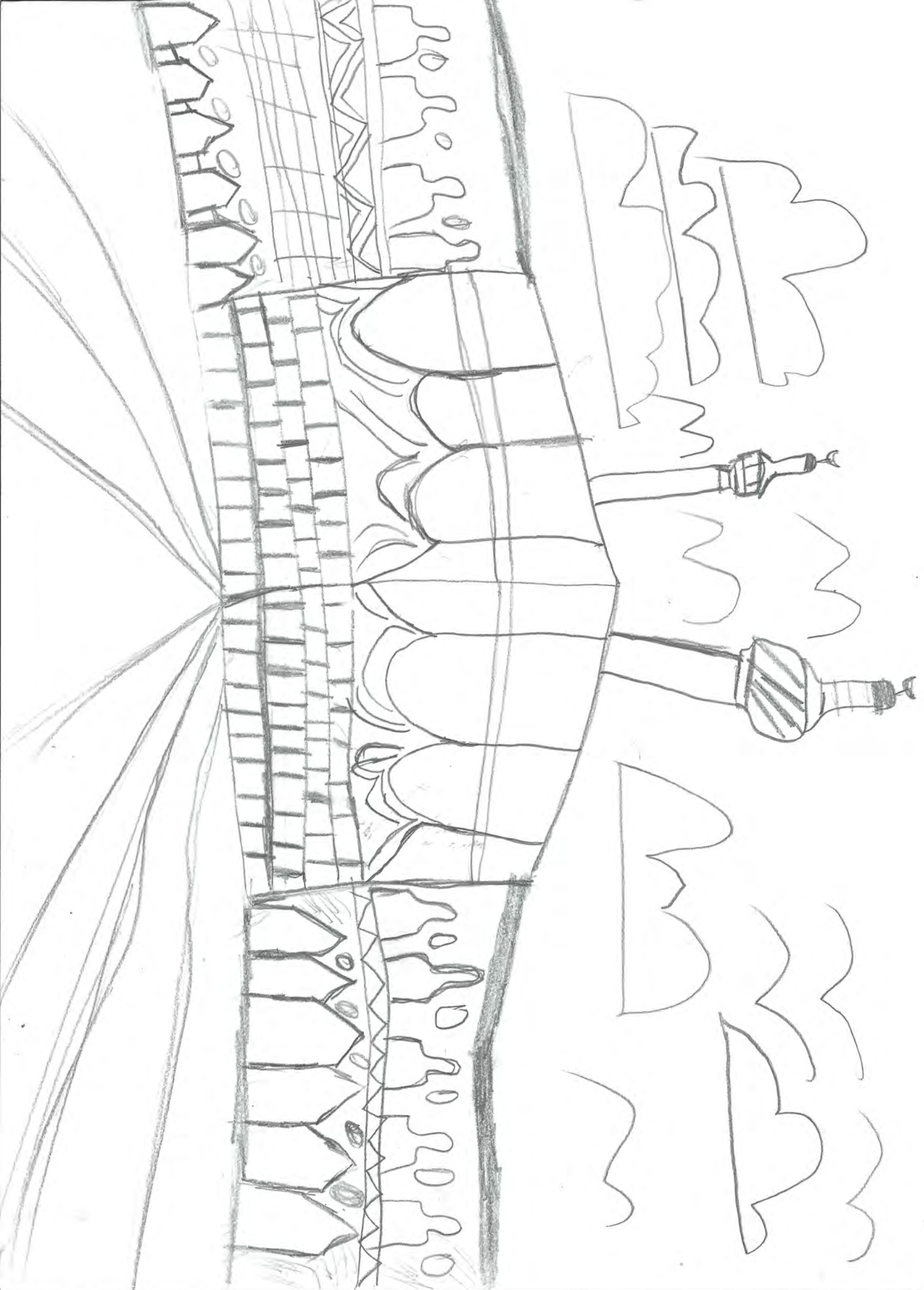






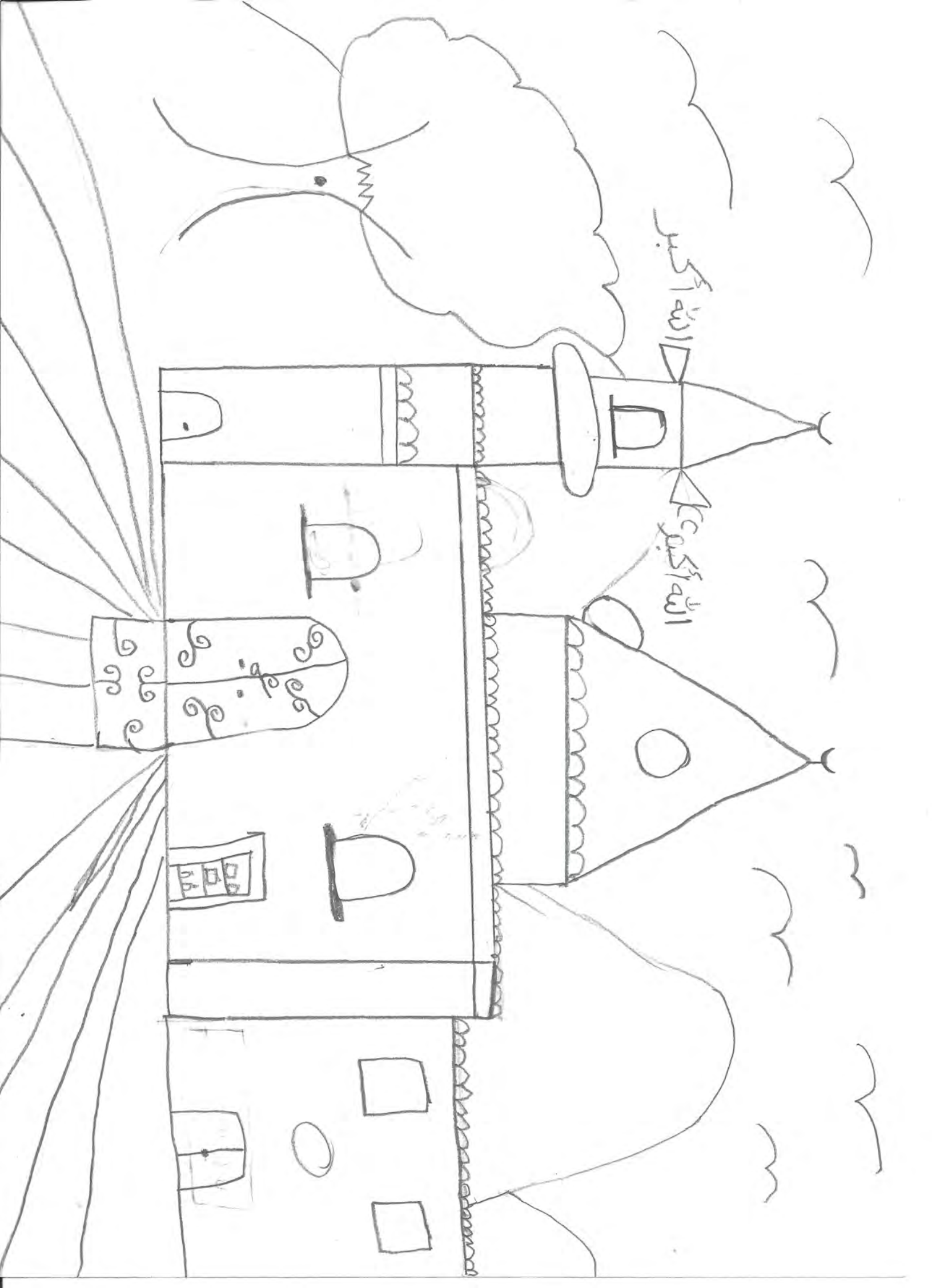


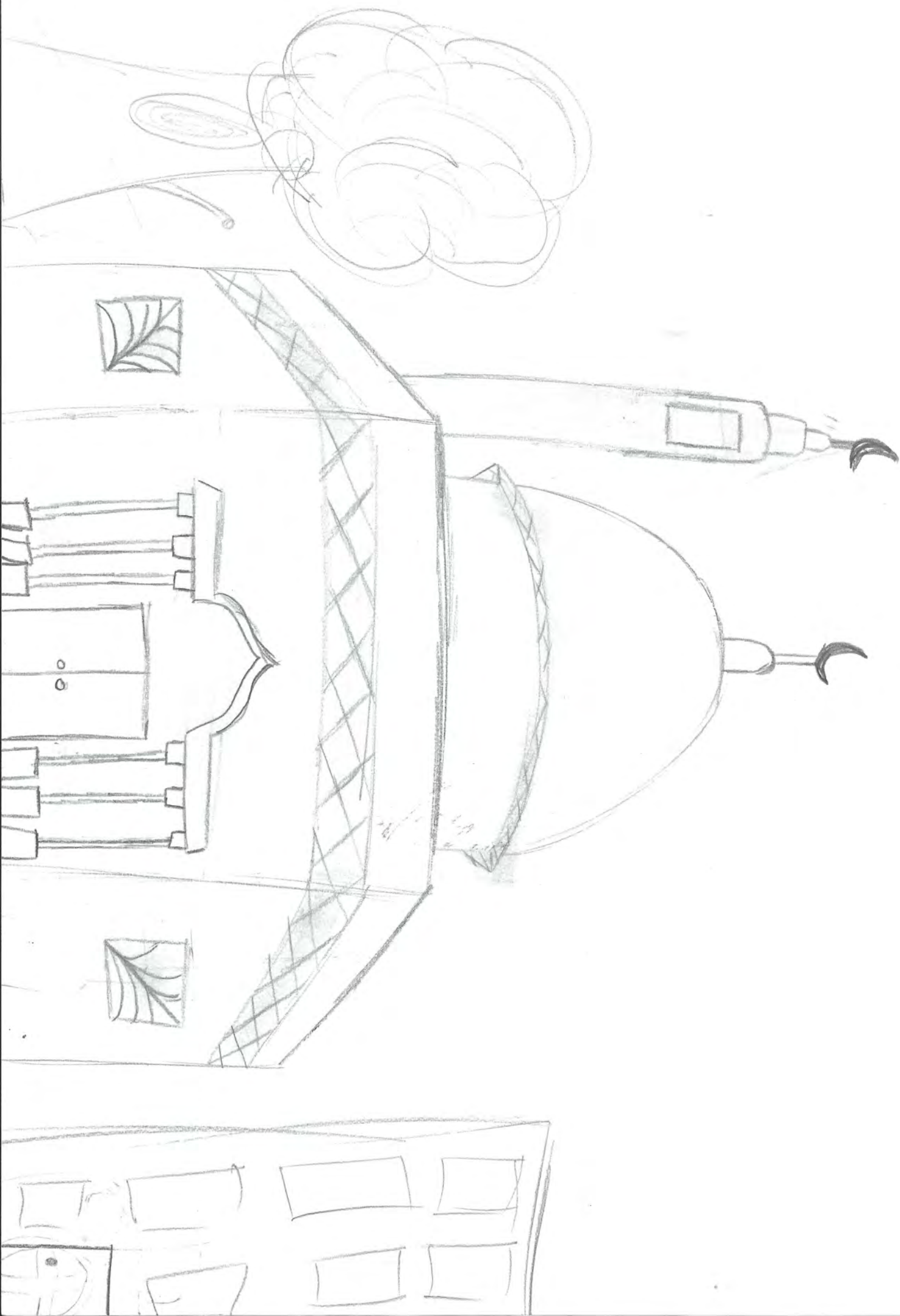




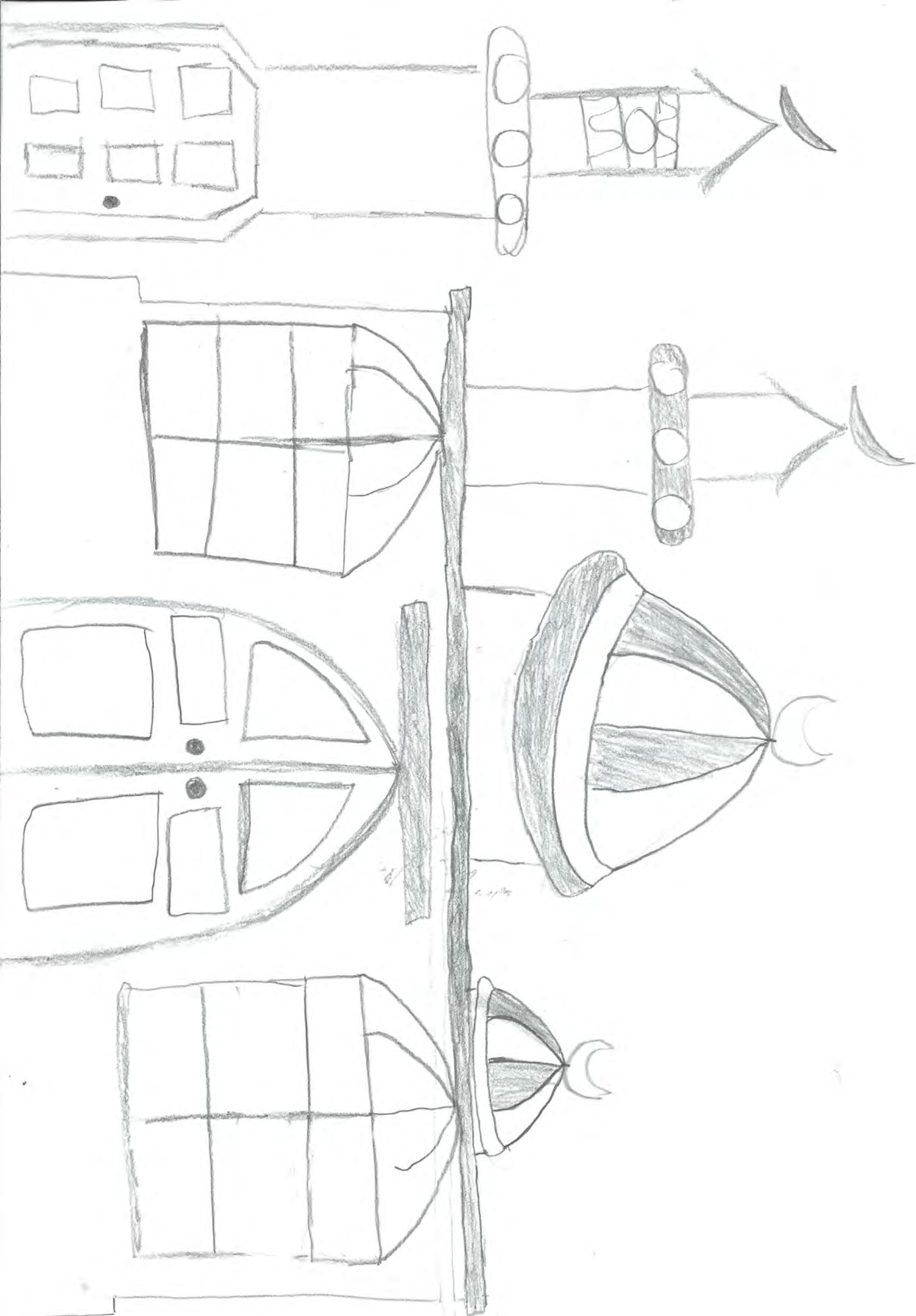


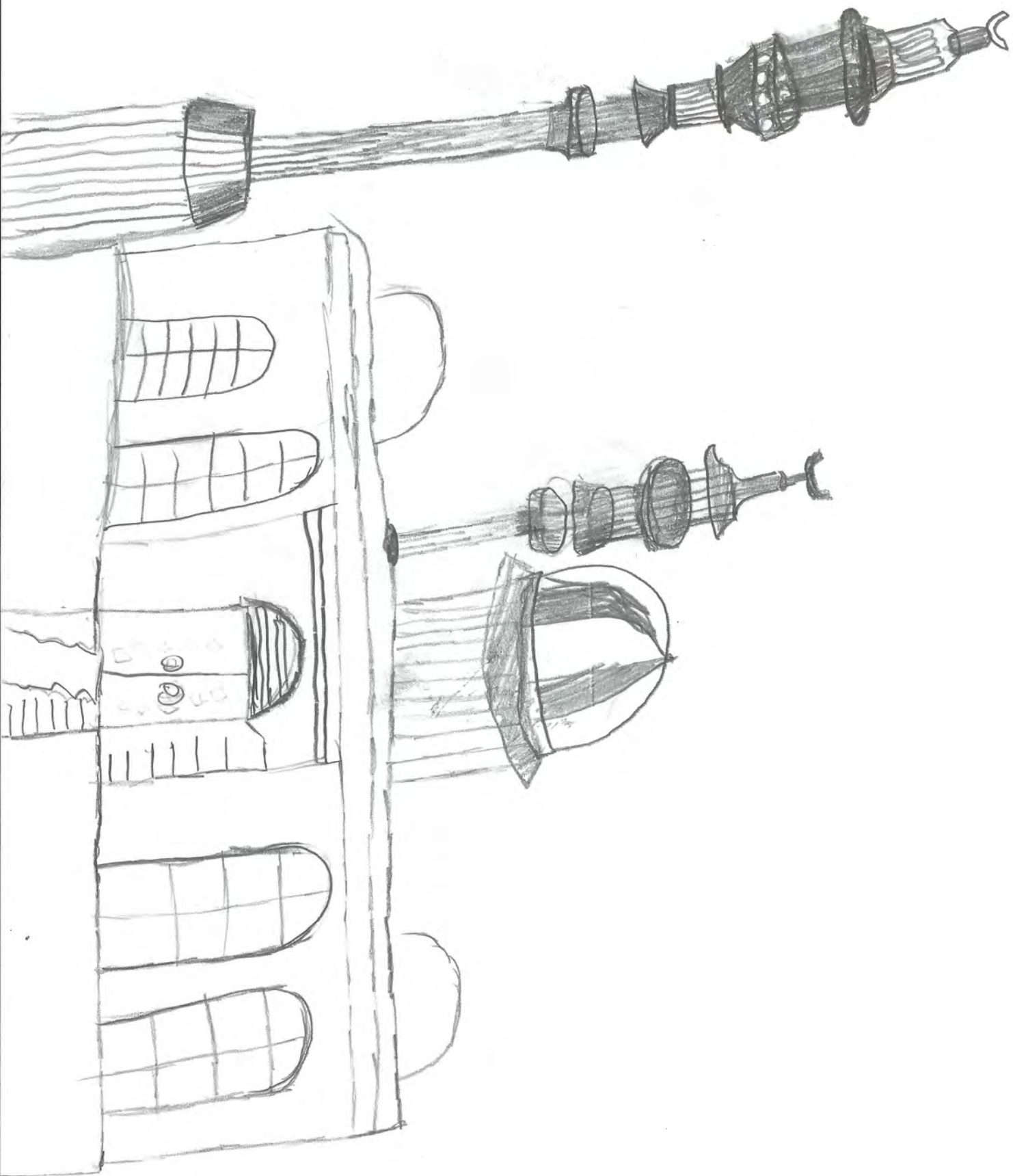


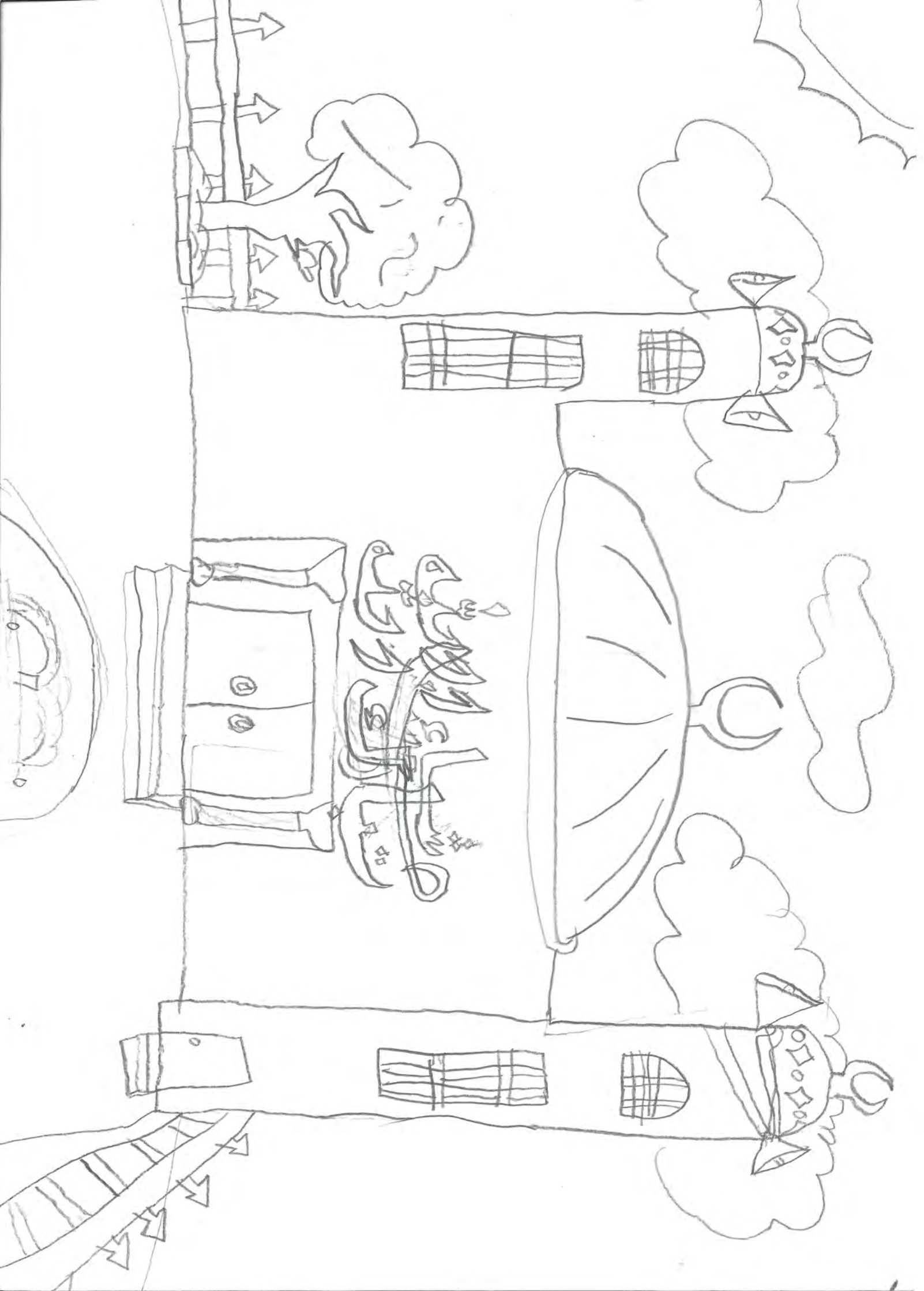




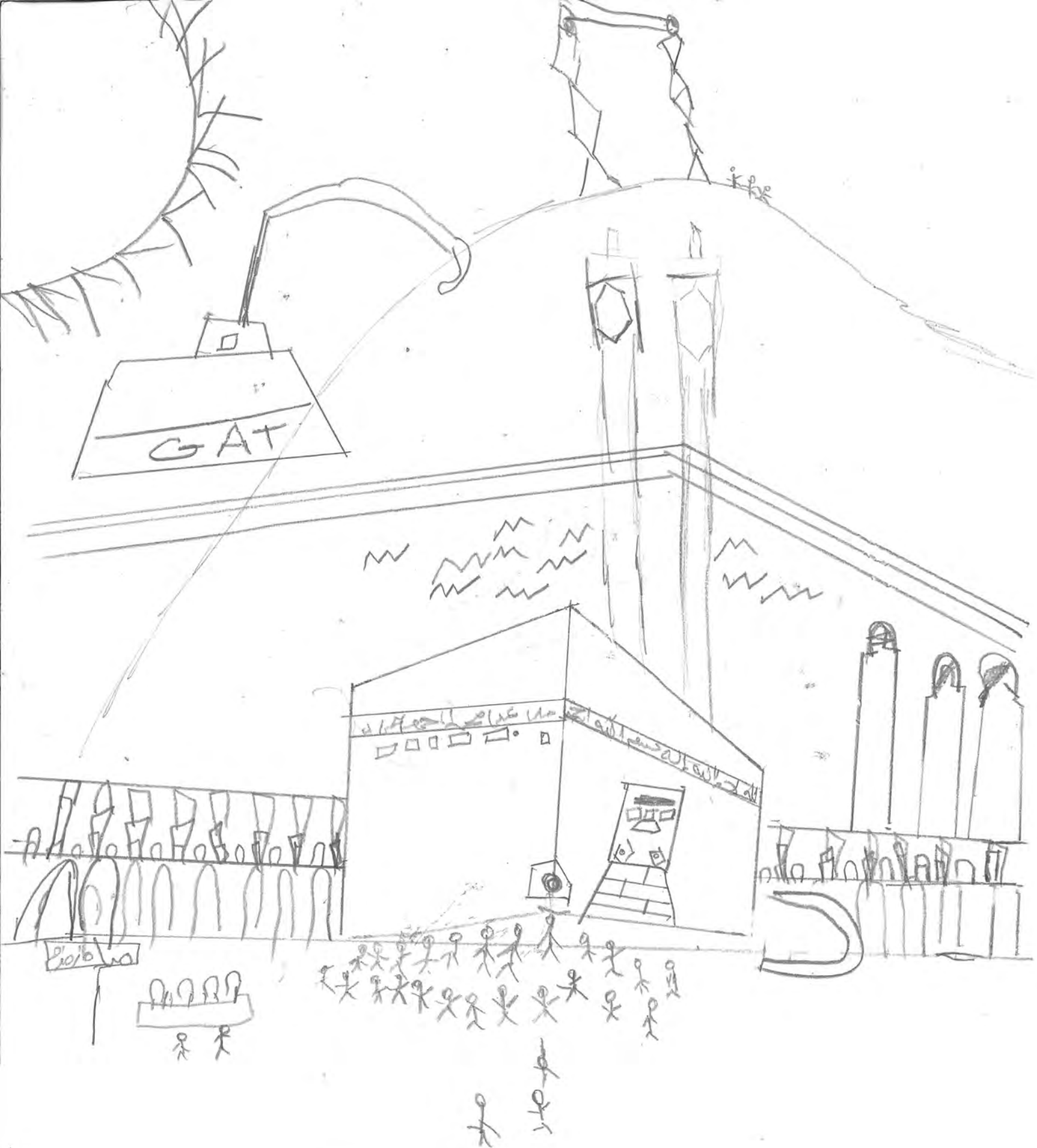


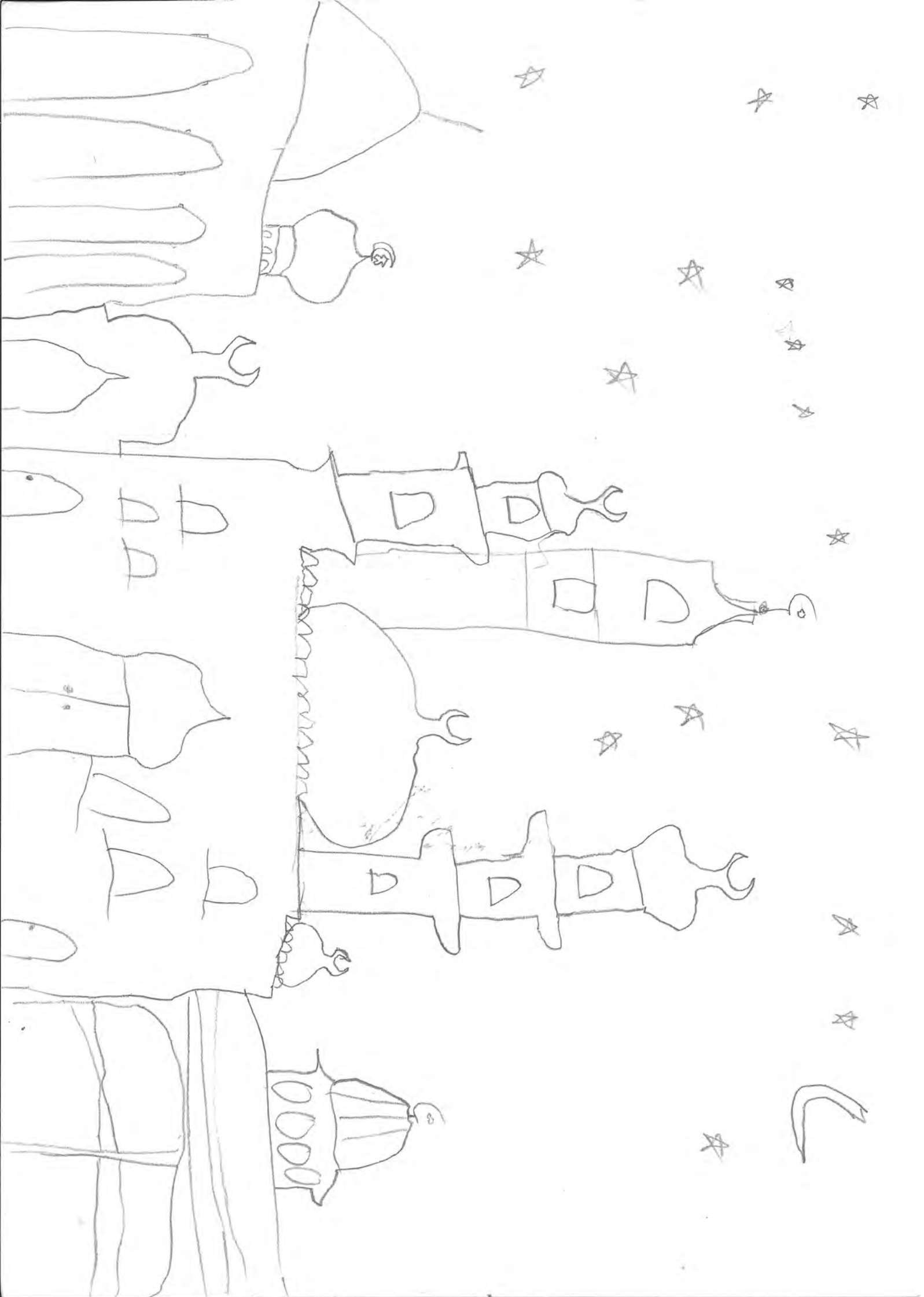


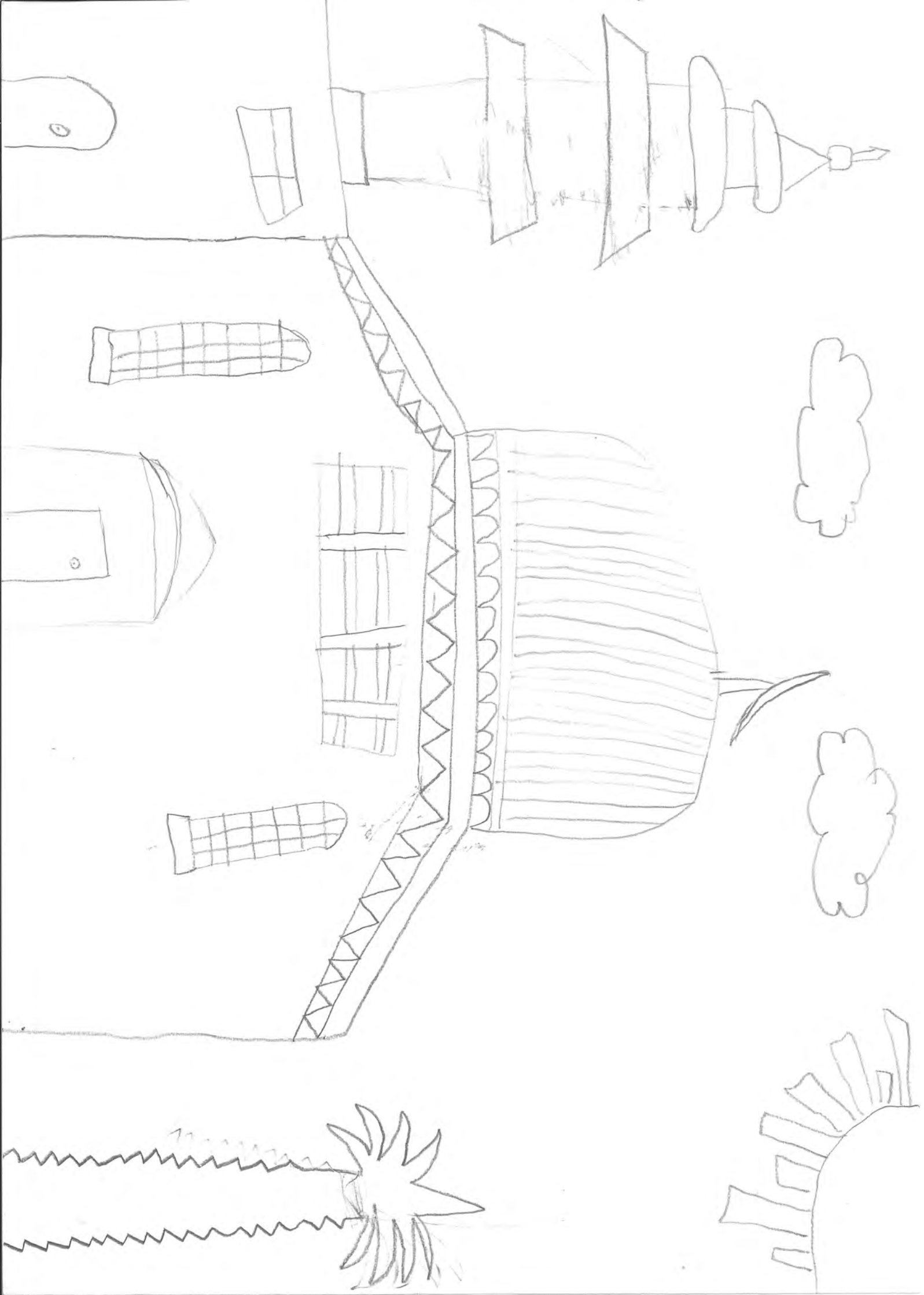


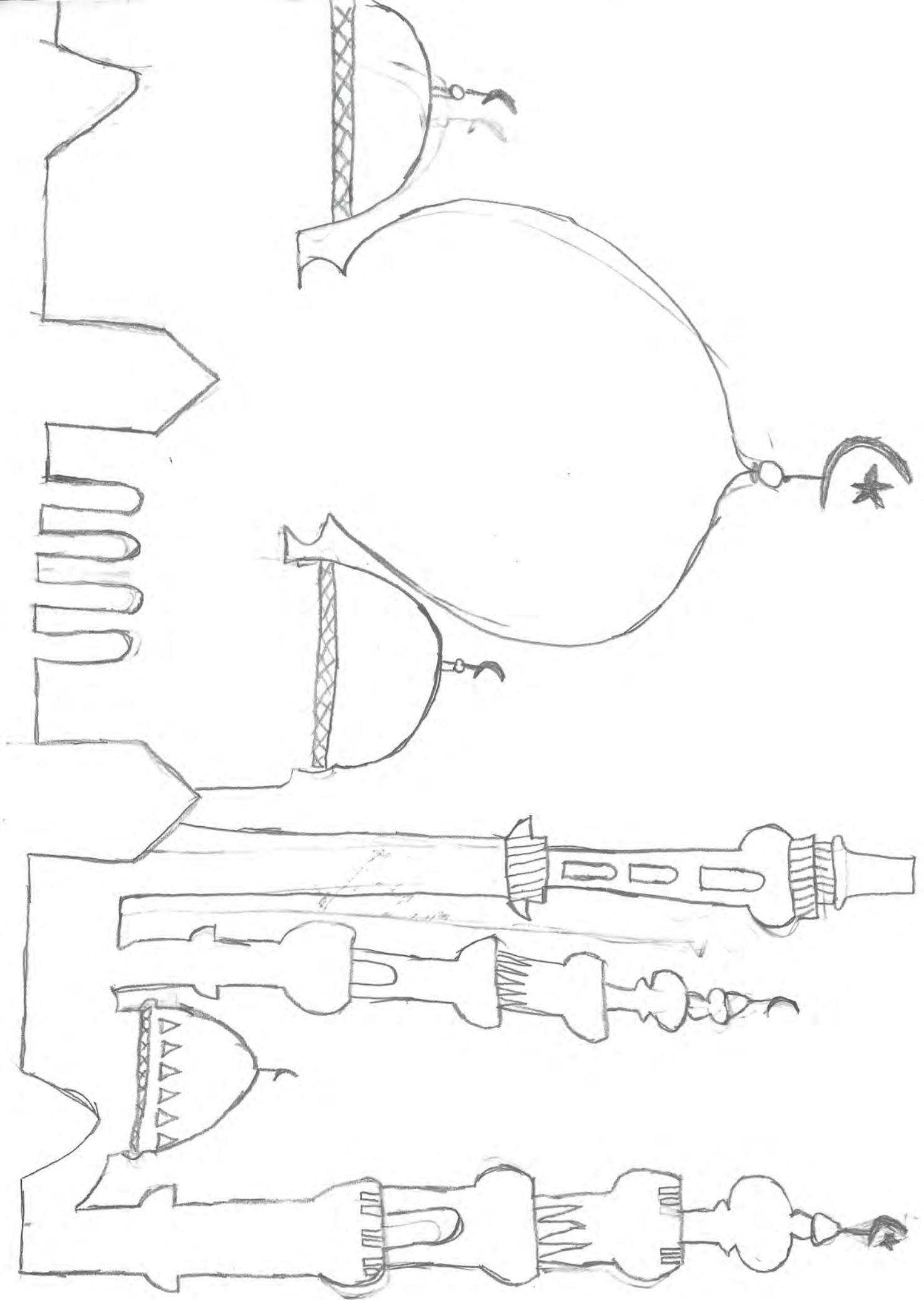


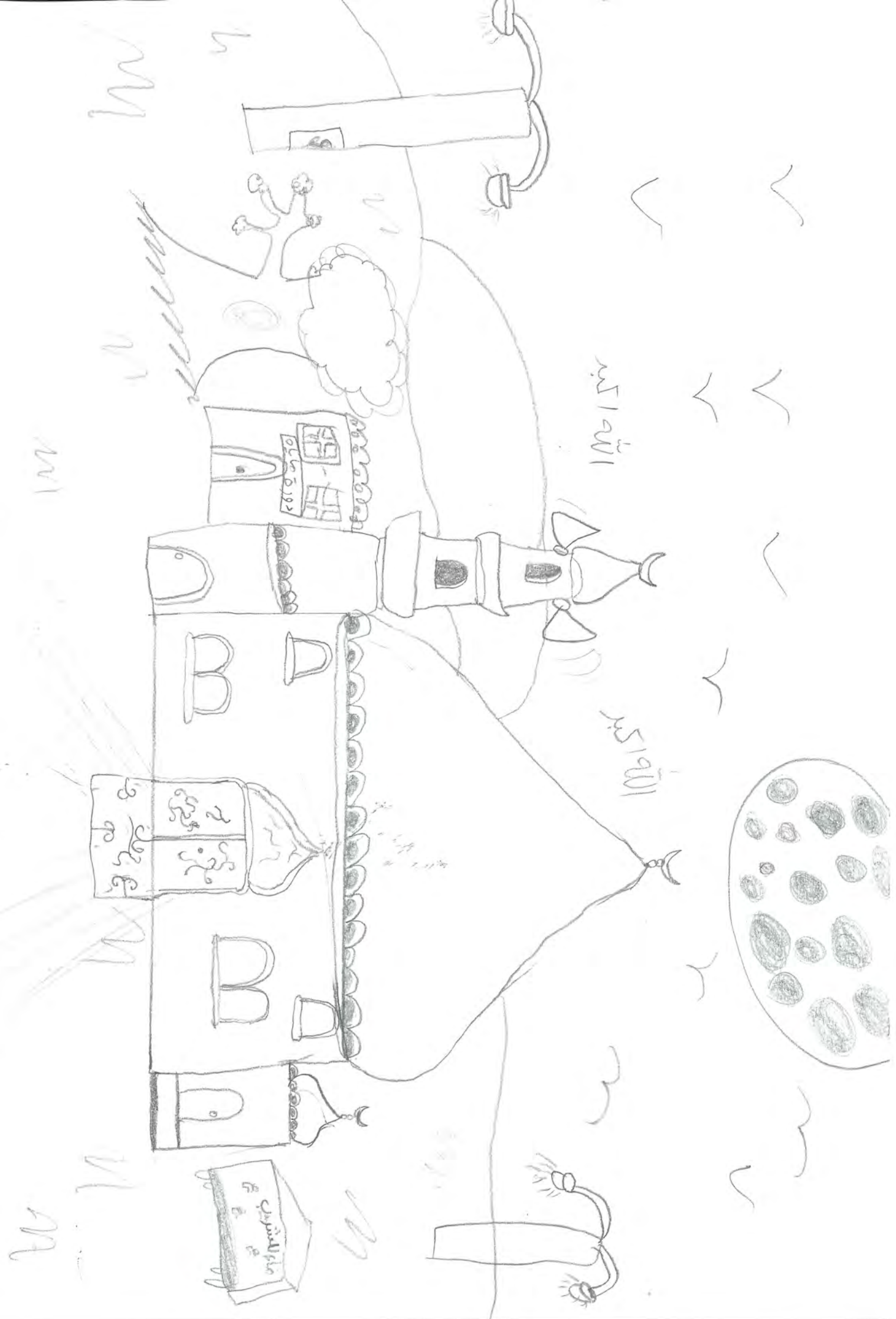












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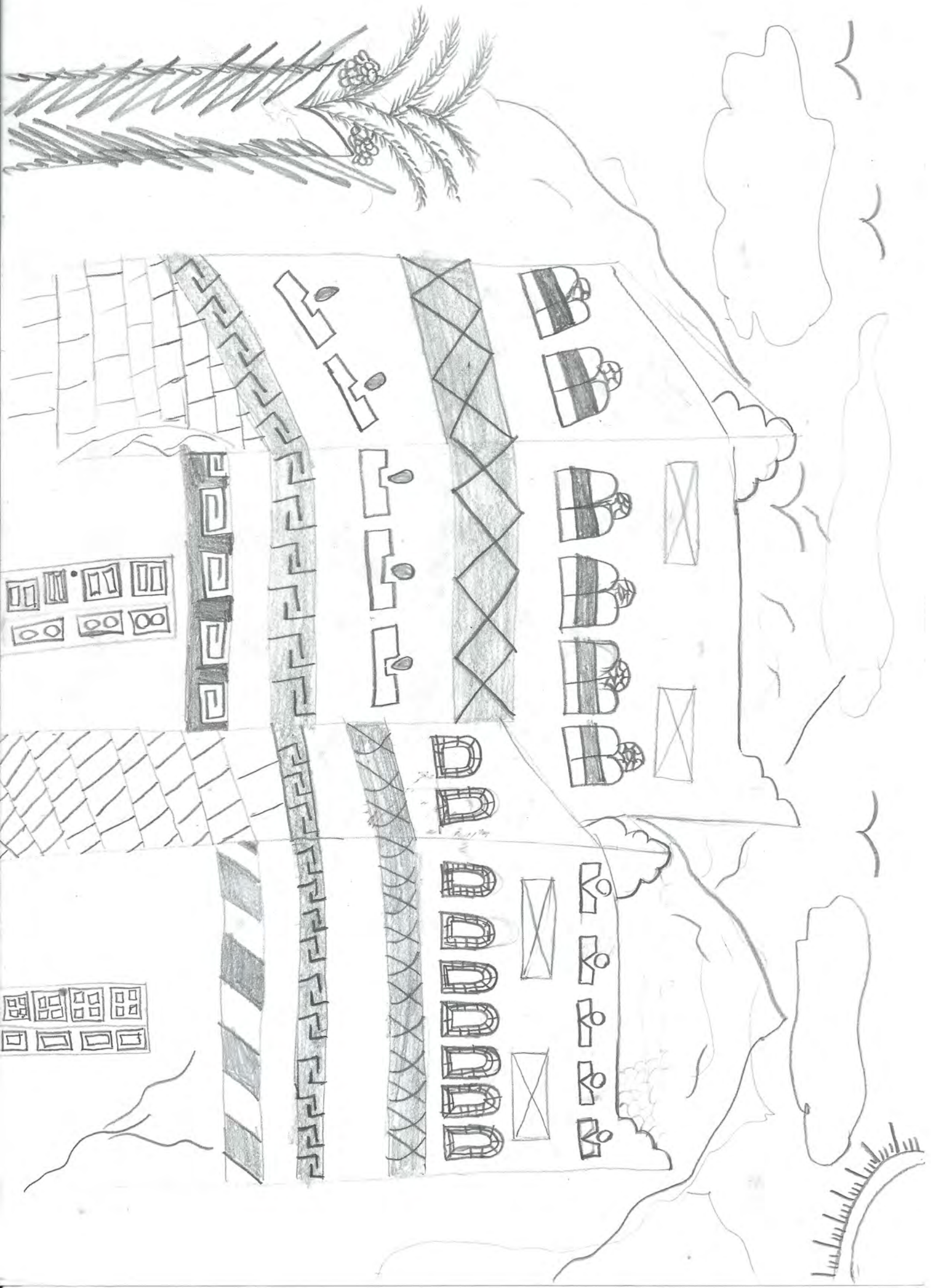
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## **Experiment 3**

Experiment 3 involved testing instruction and engagement in combination and excluded evaluation. The design brief in this experiment will be draw a architectural heritage.

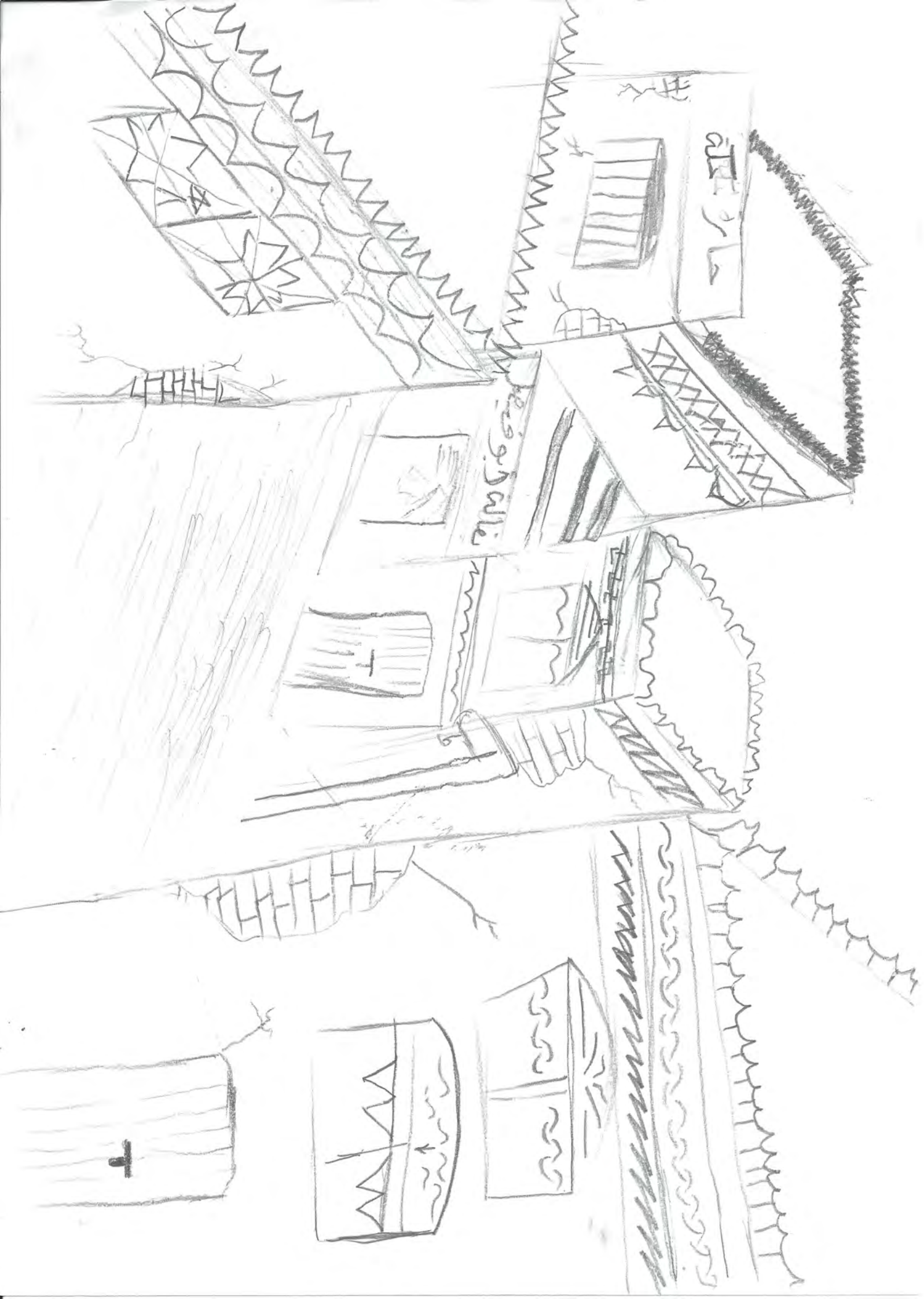








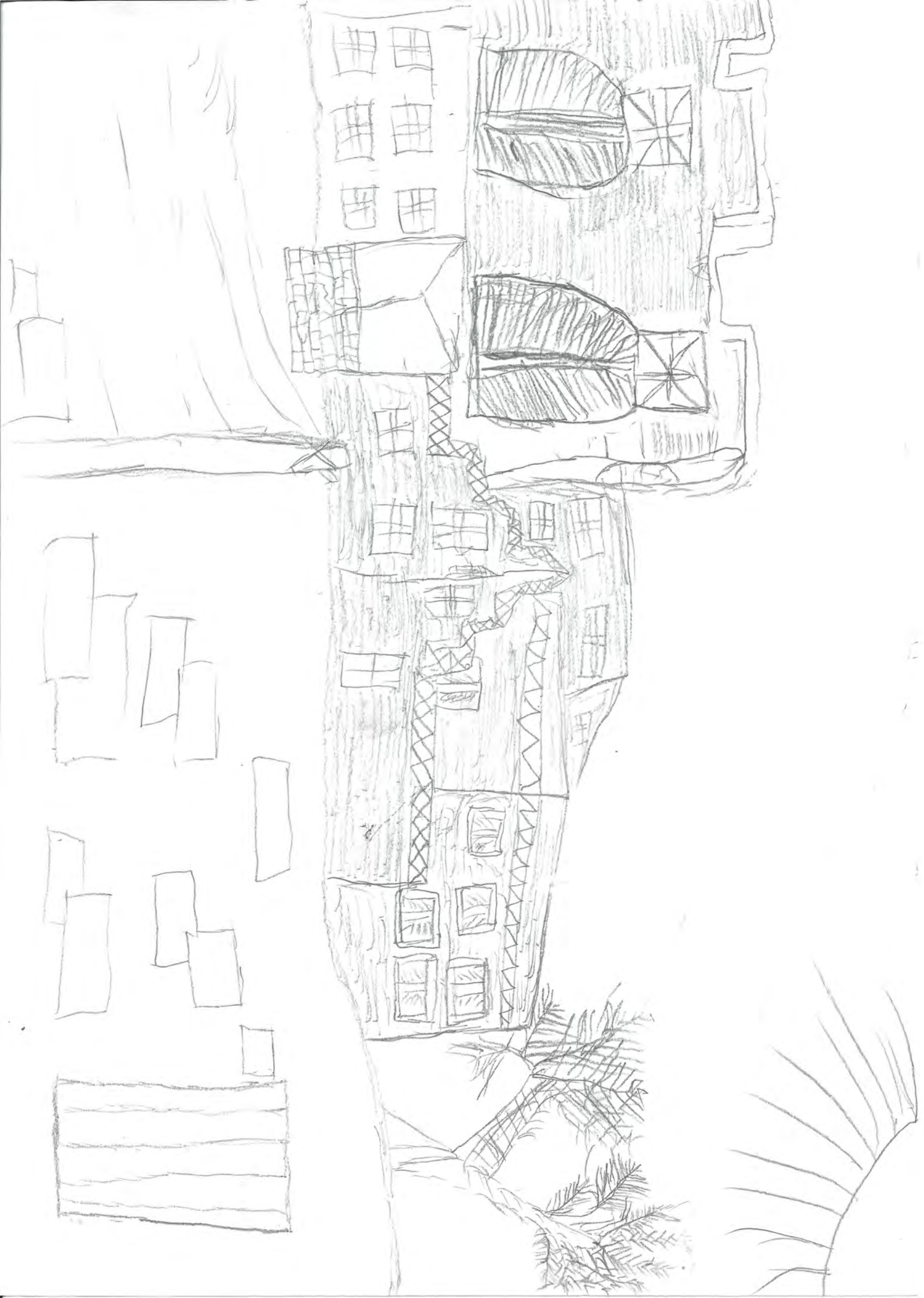




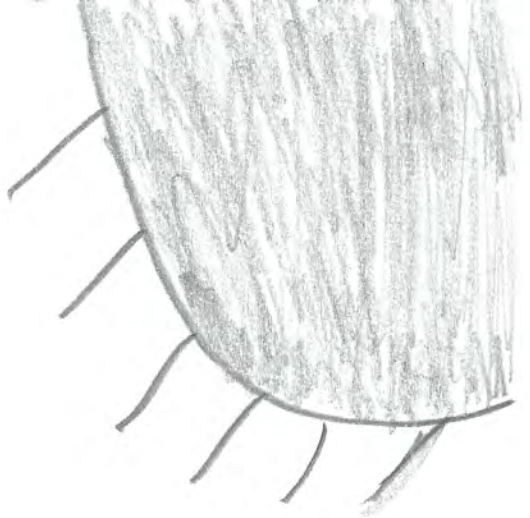
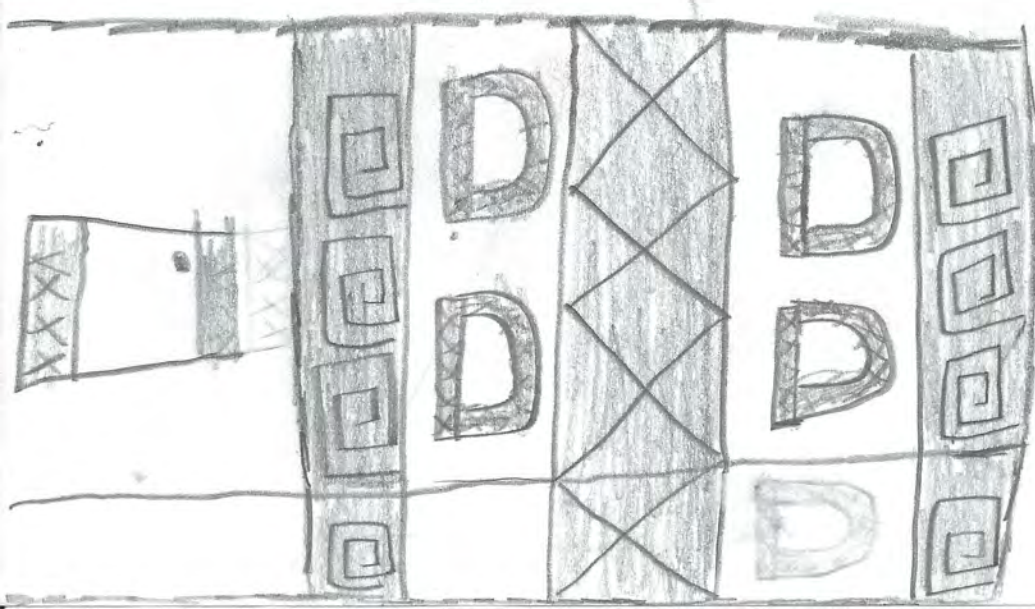
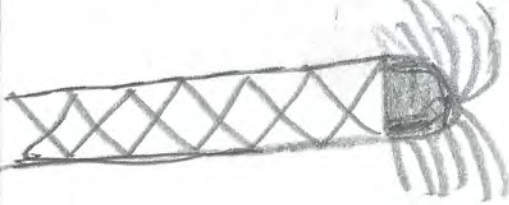
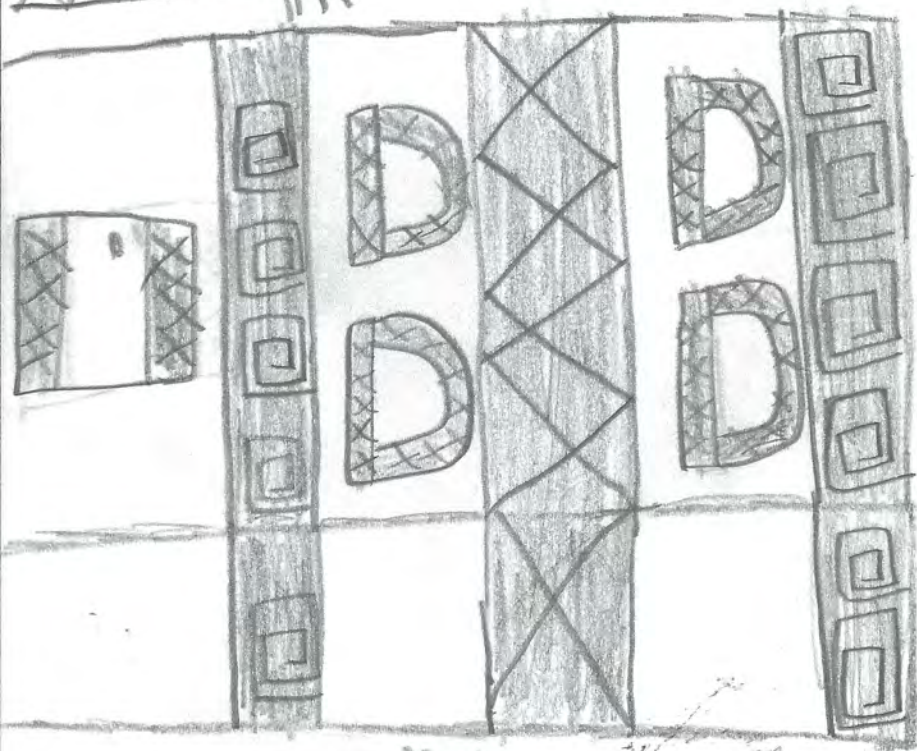
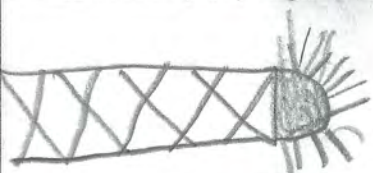
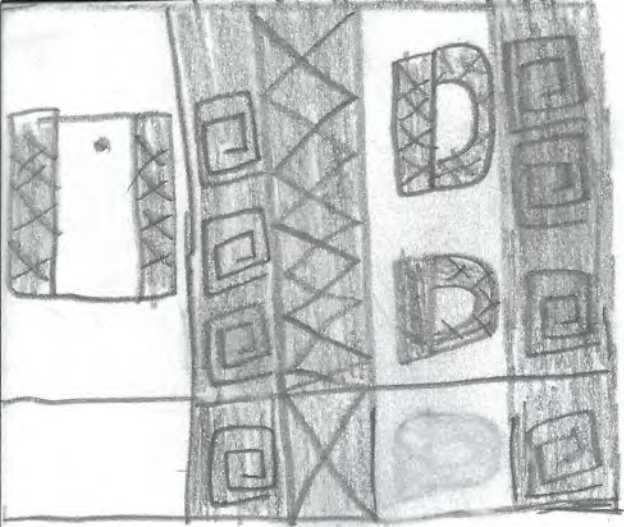




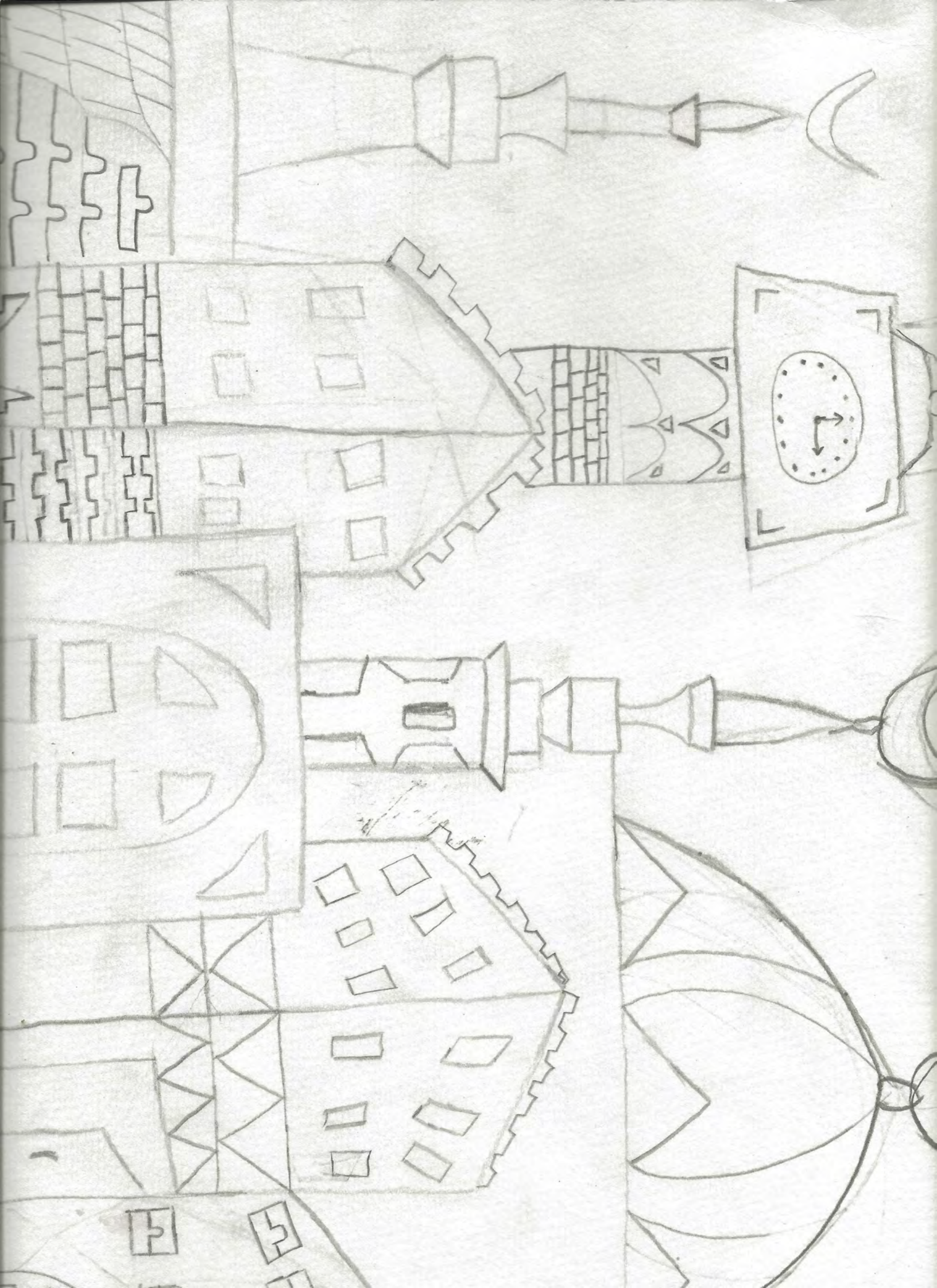




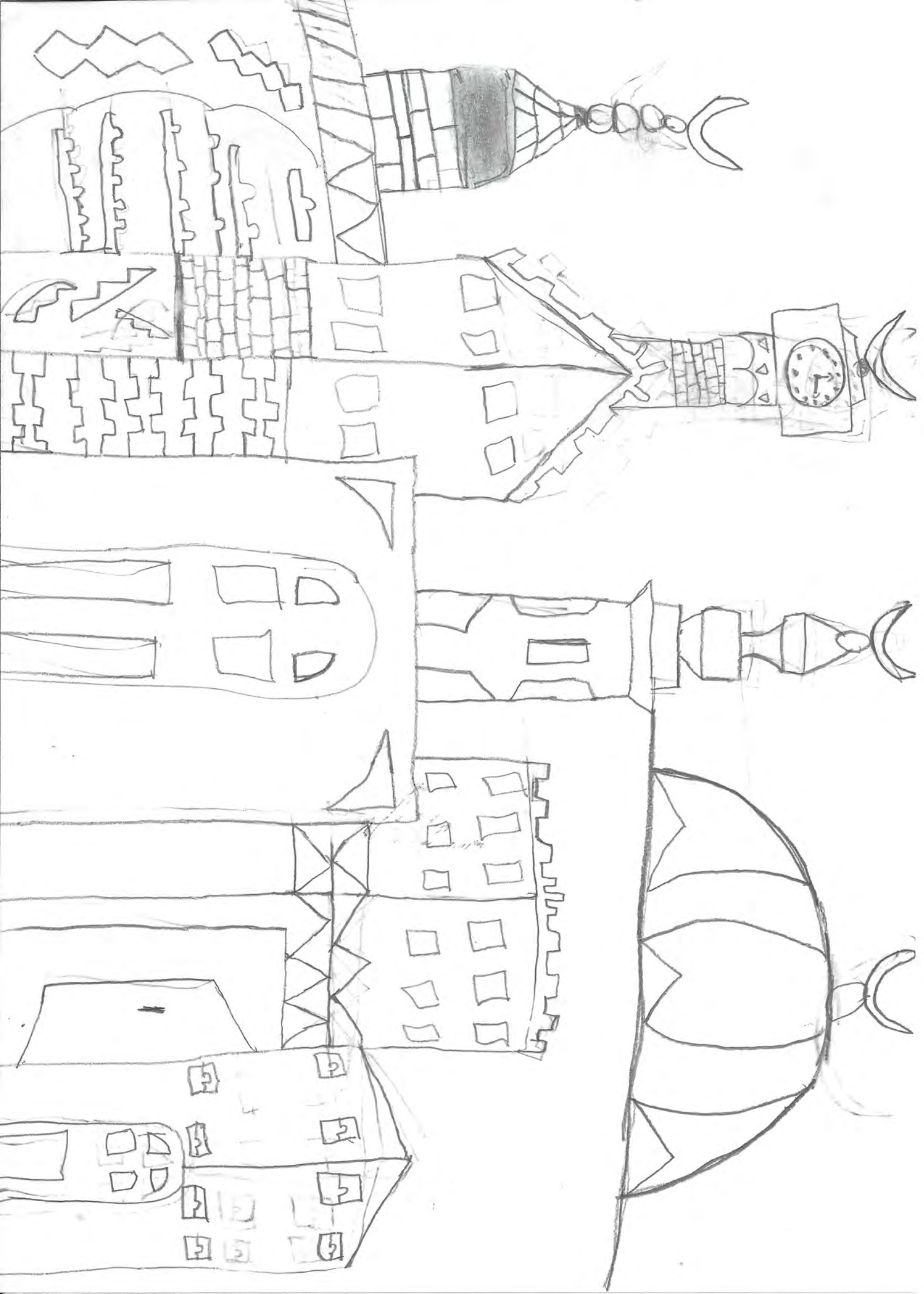


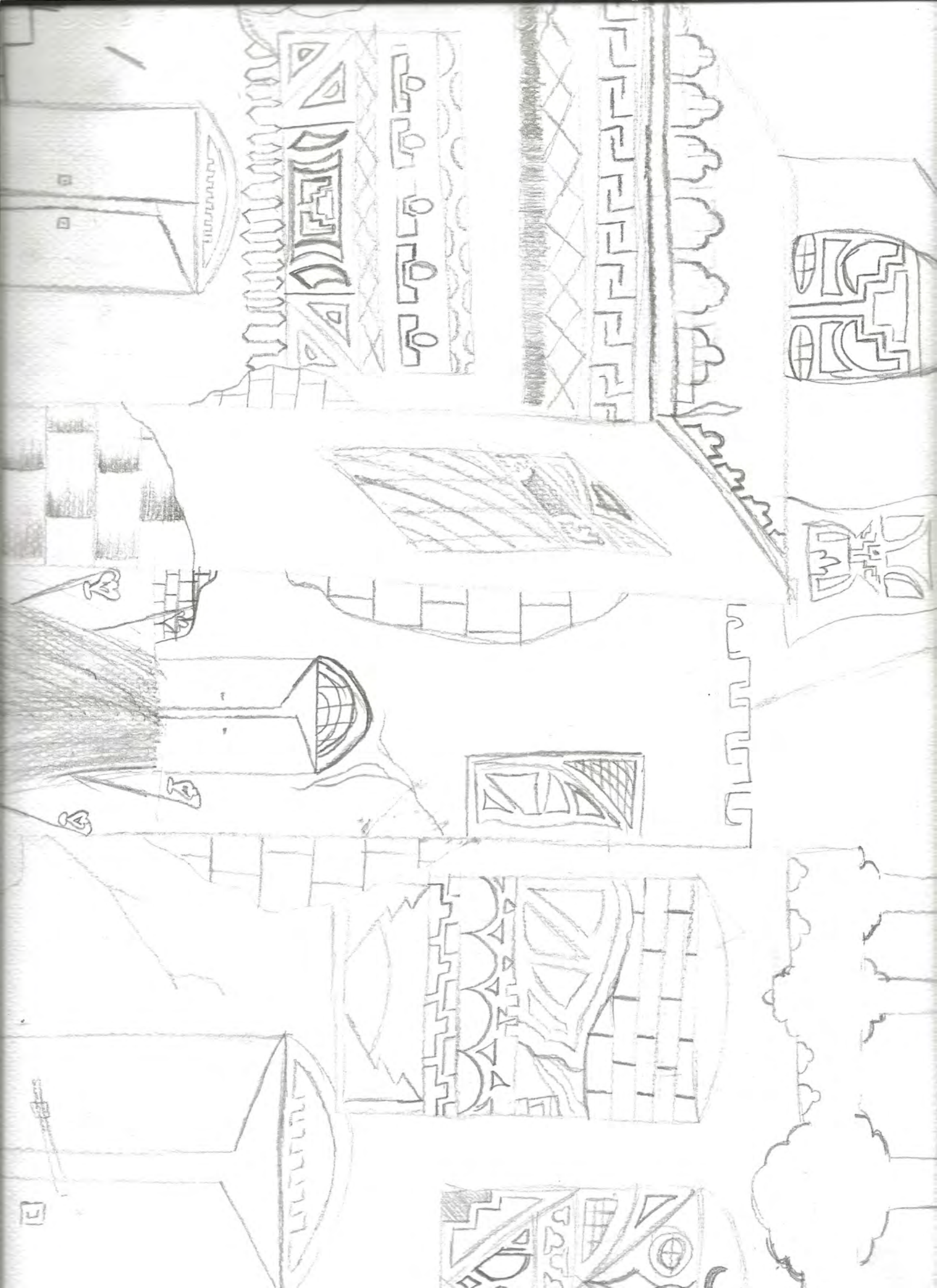






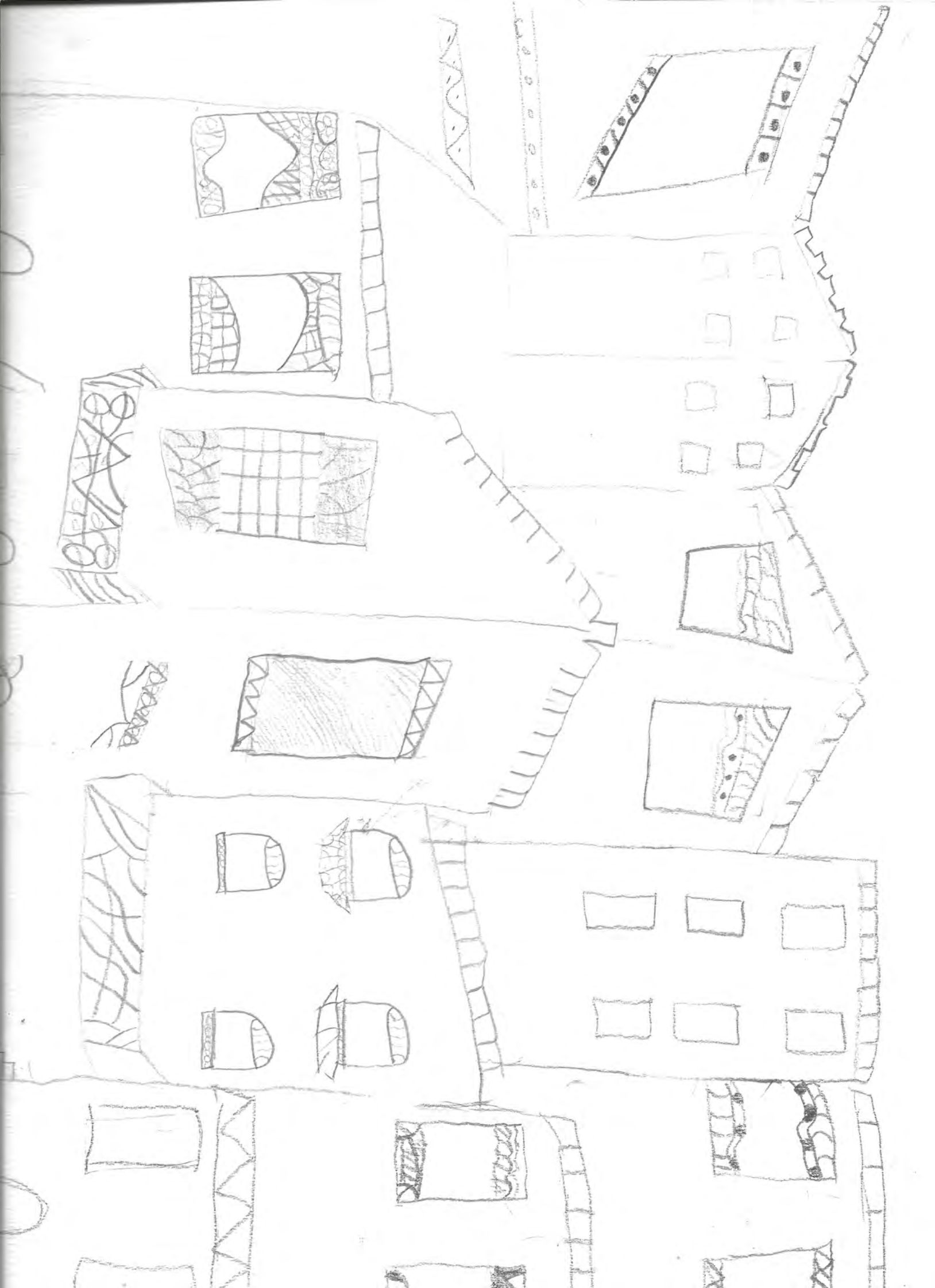








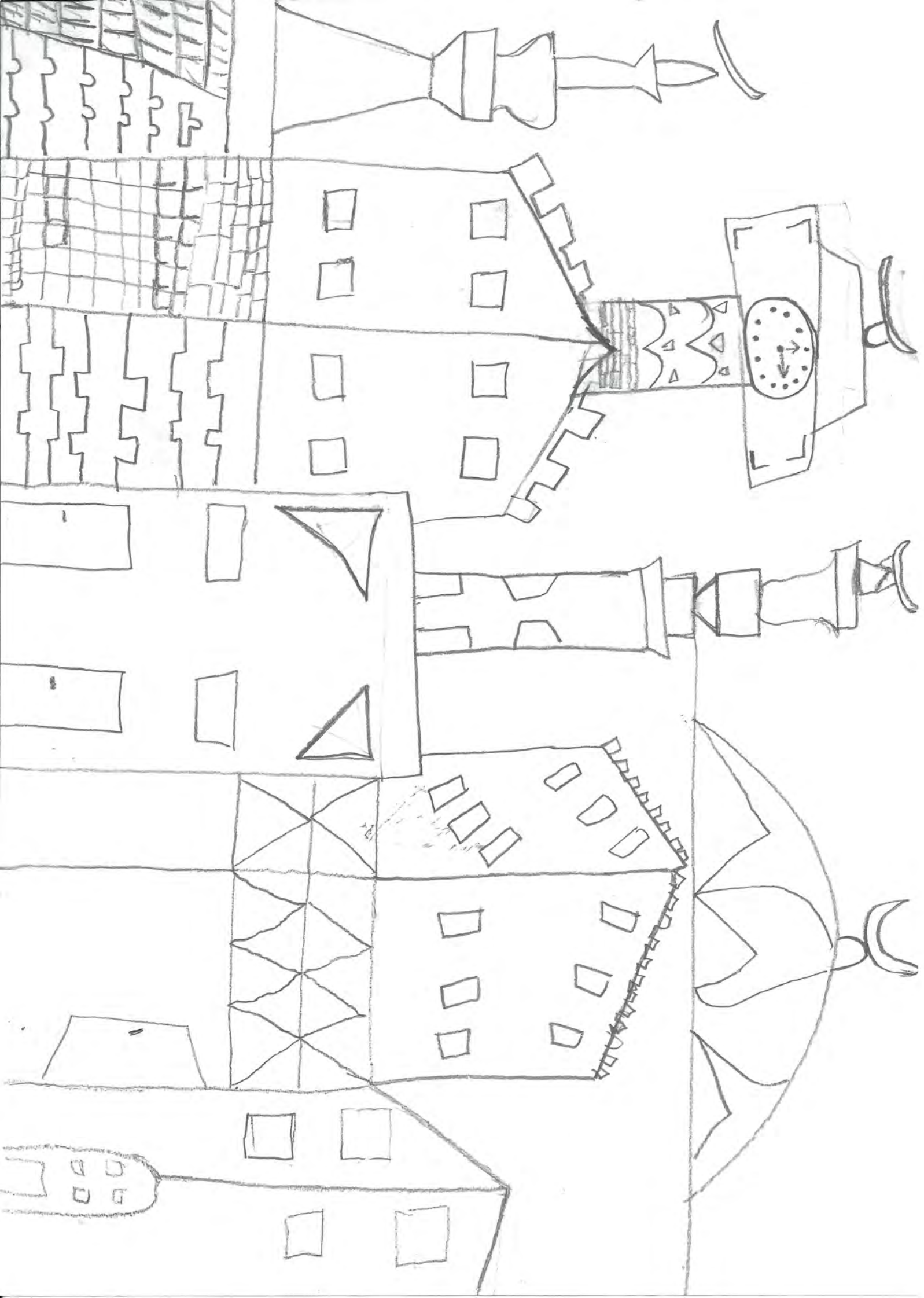


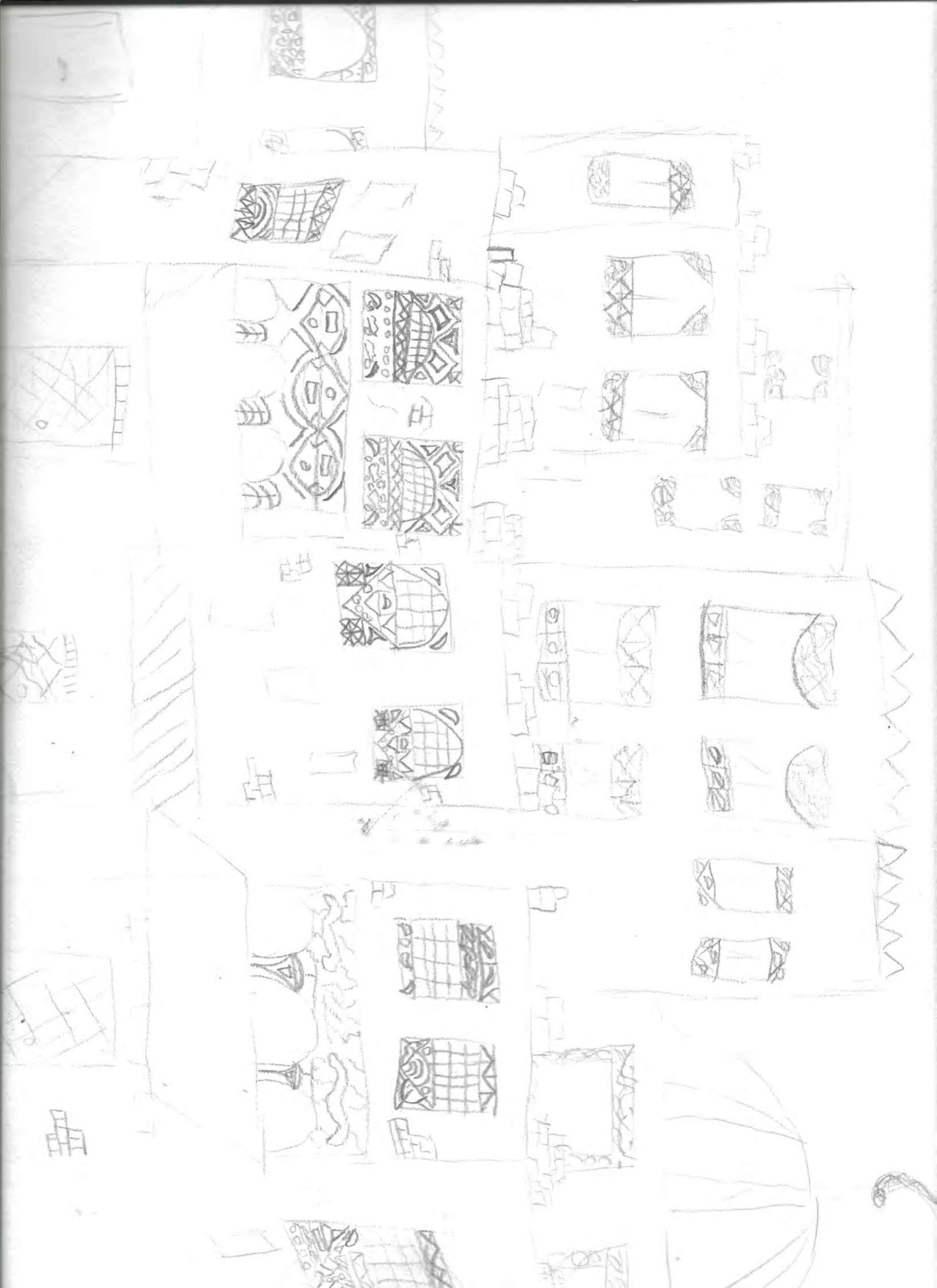




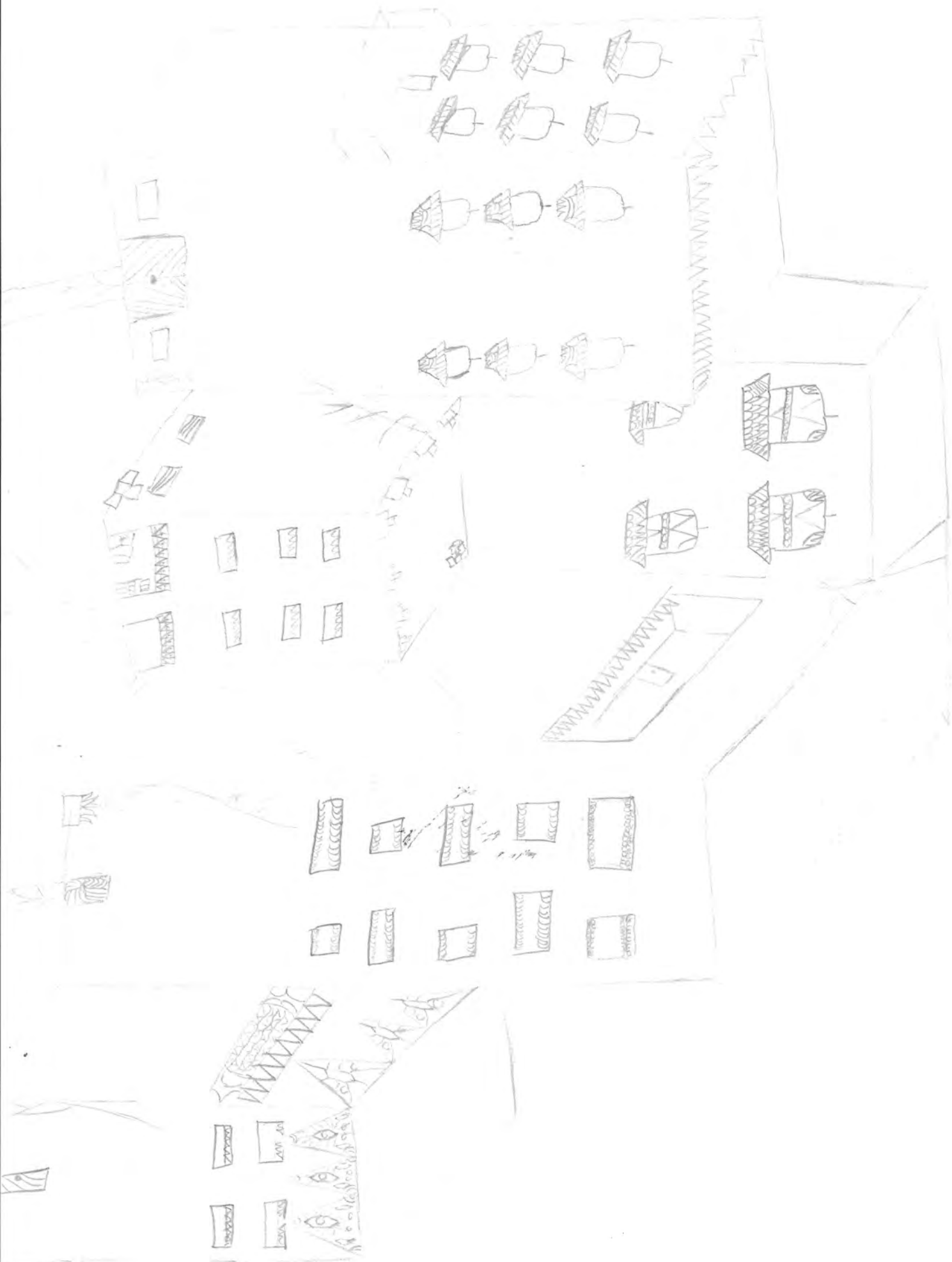


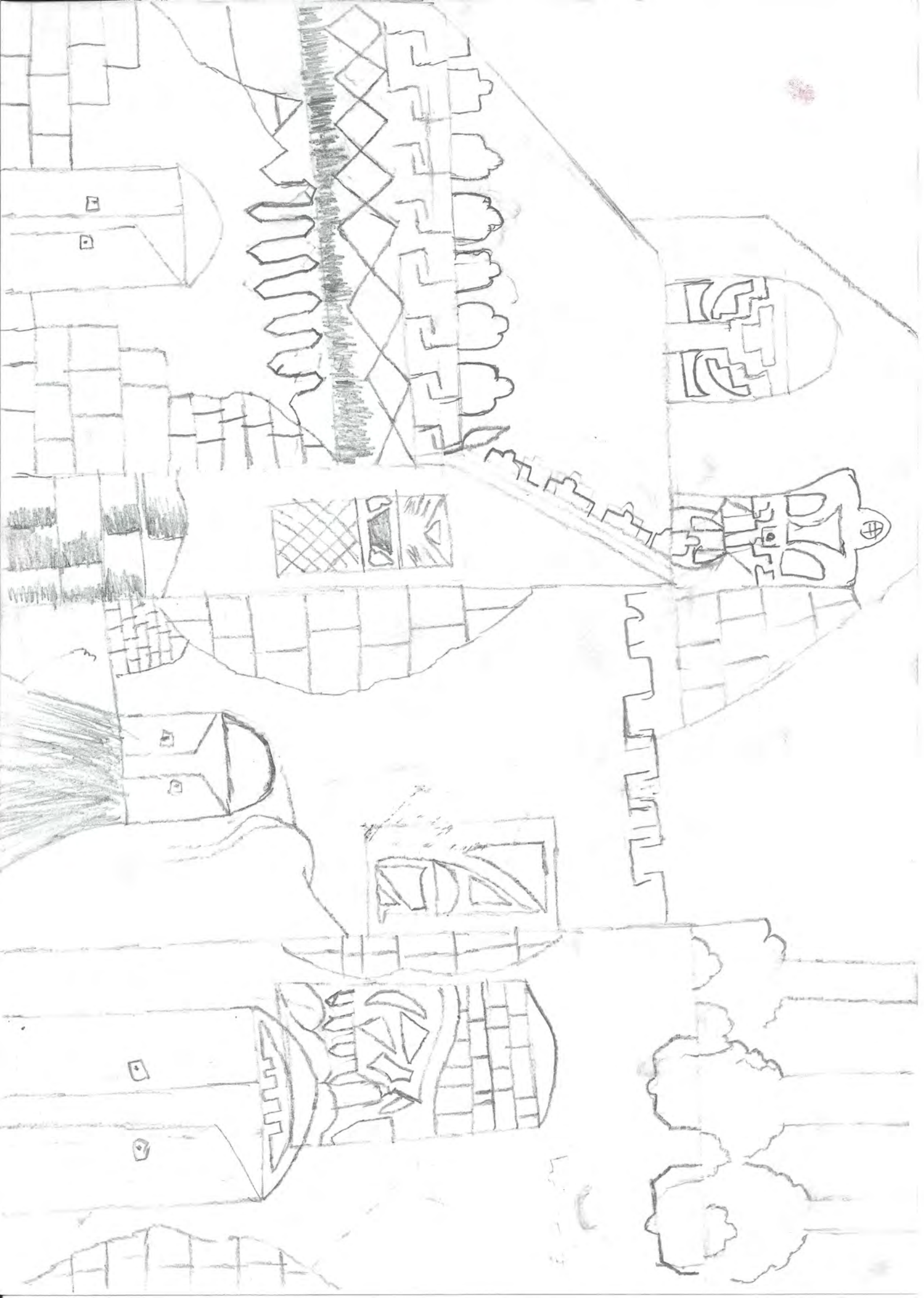








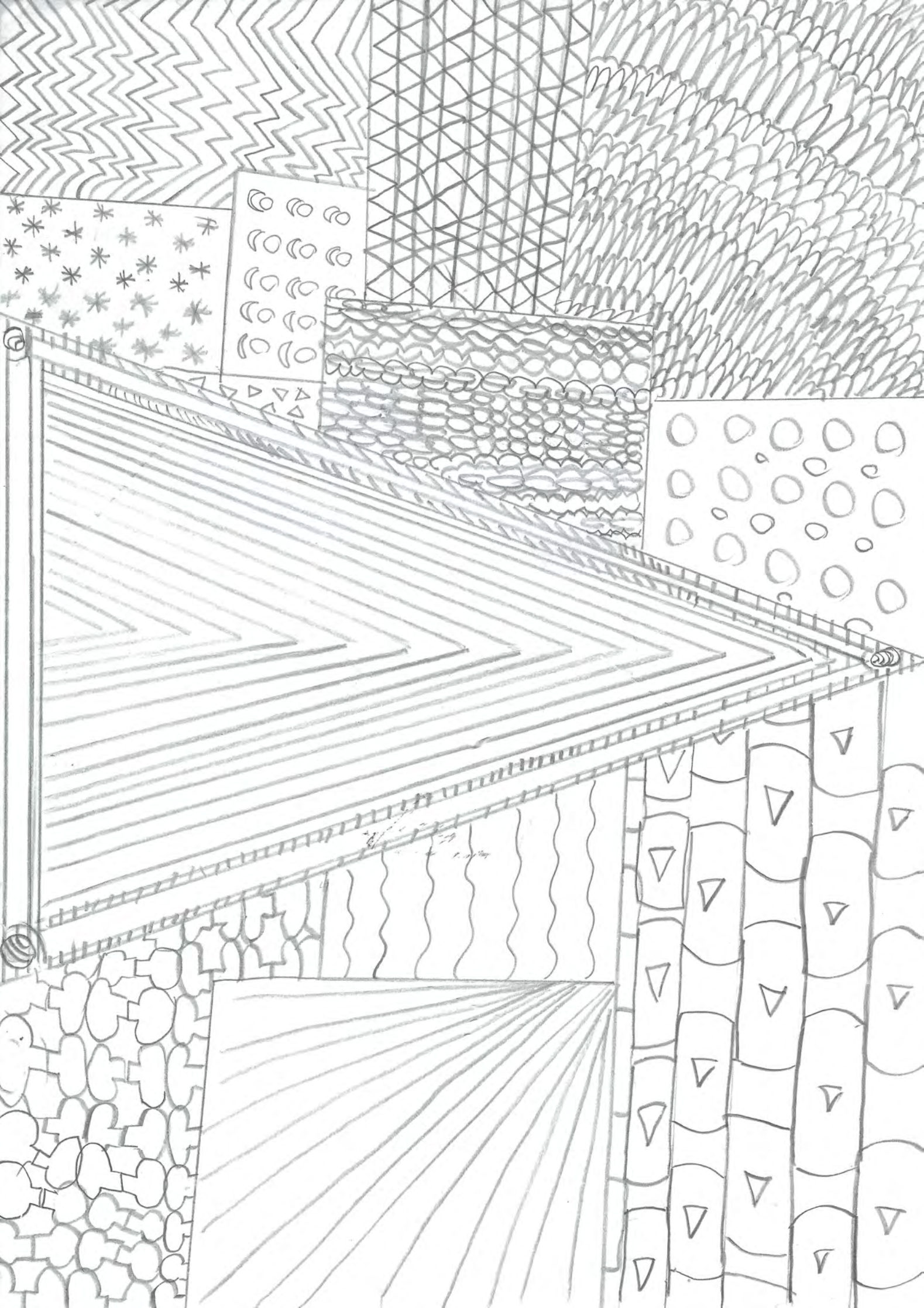




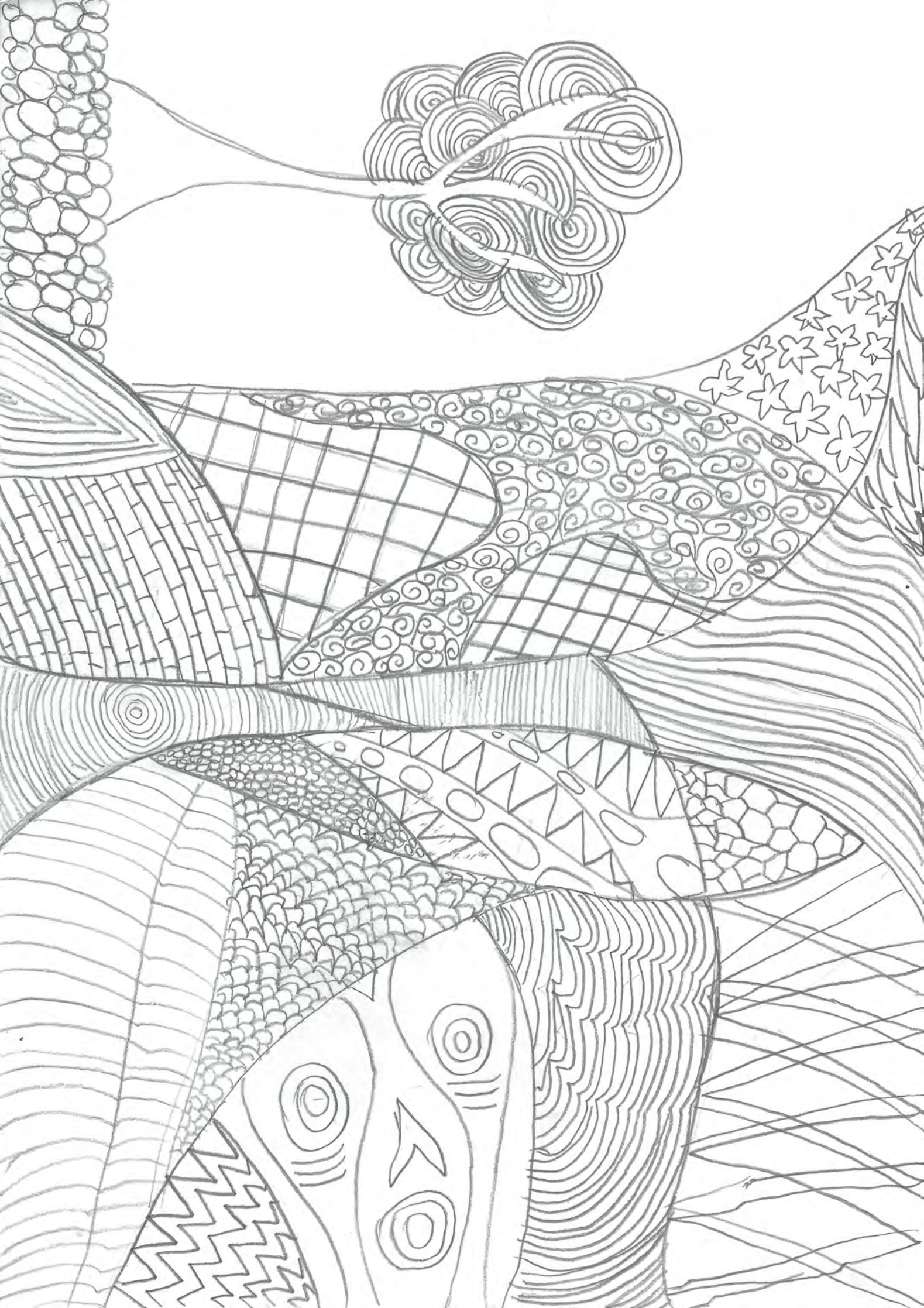


## **Experiment 4**

Experiment 4 involved testing instruction and evaluation in combination and excluded engagement. The design brief in this experiment will be draw a Islamic symmetrical.







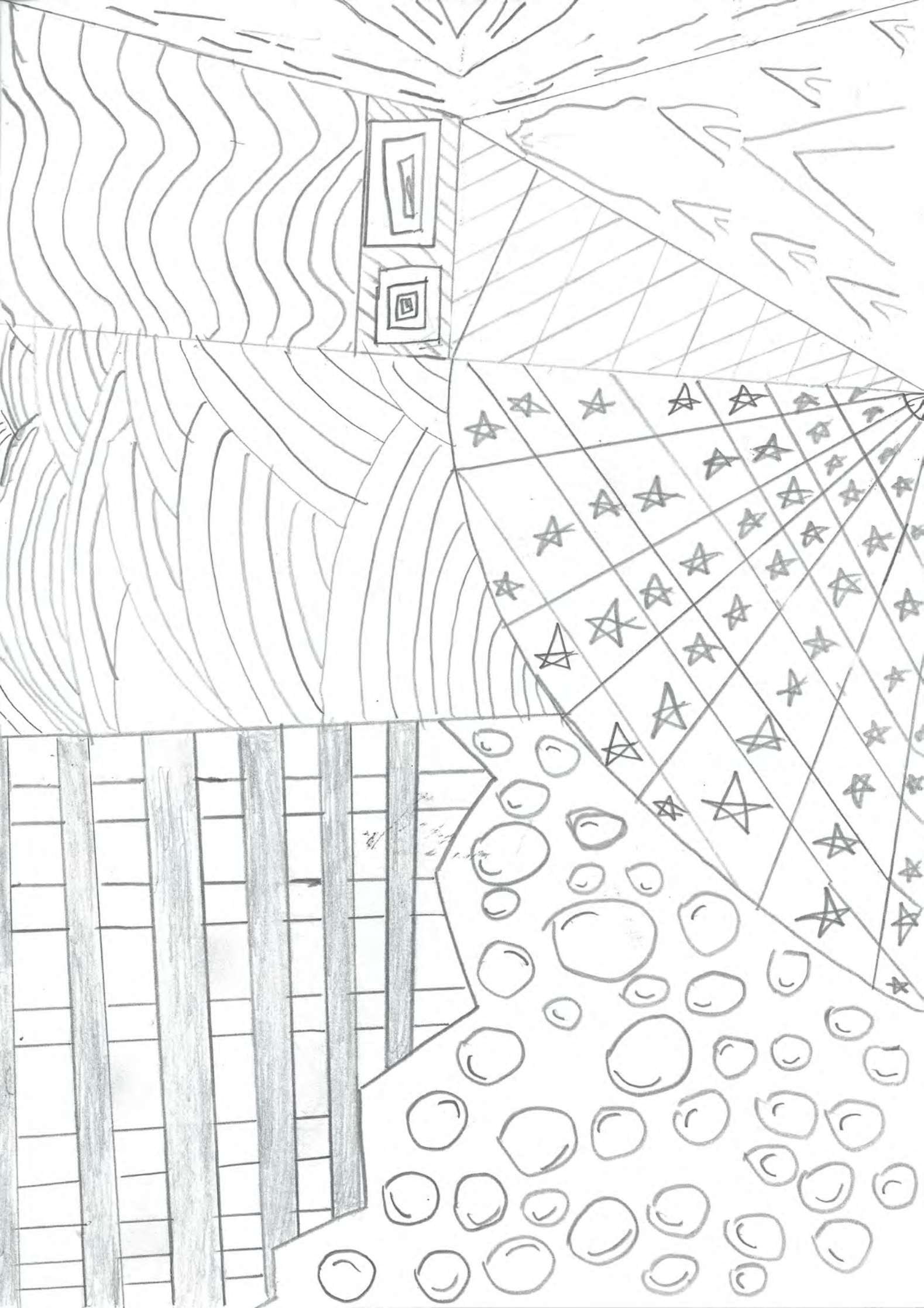




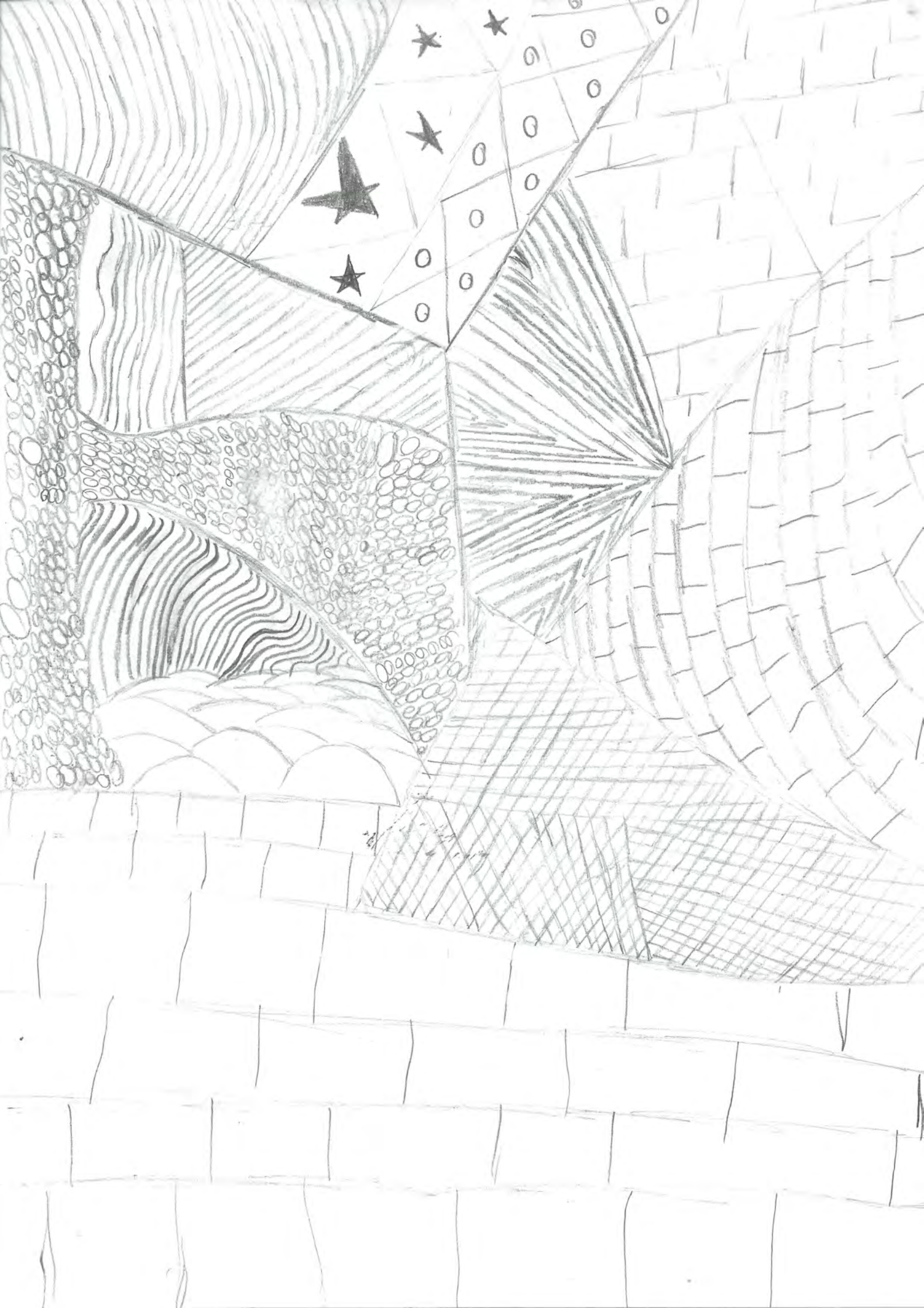








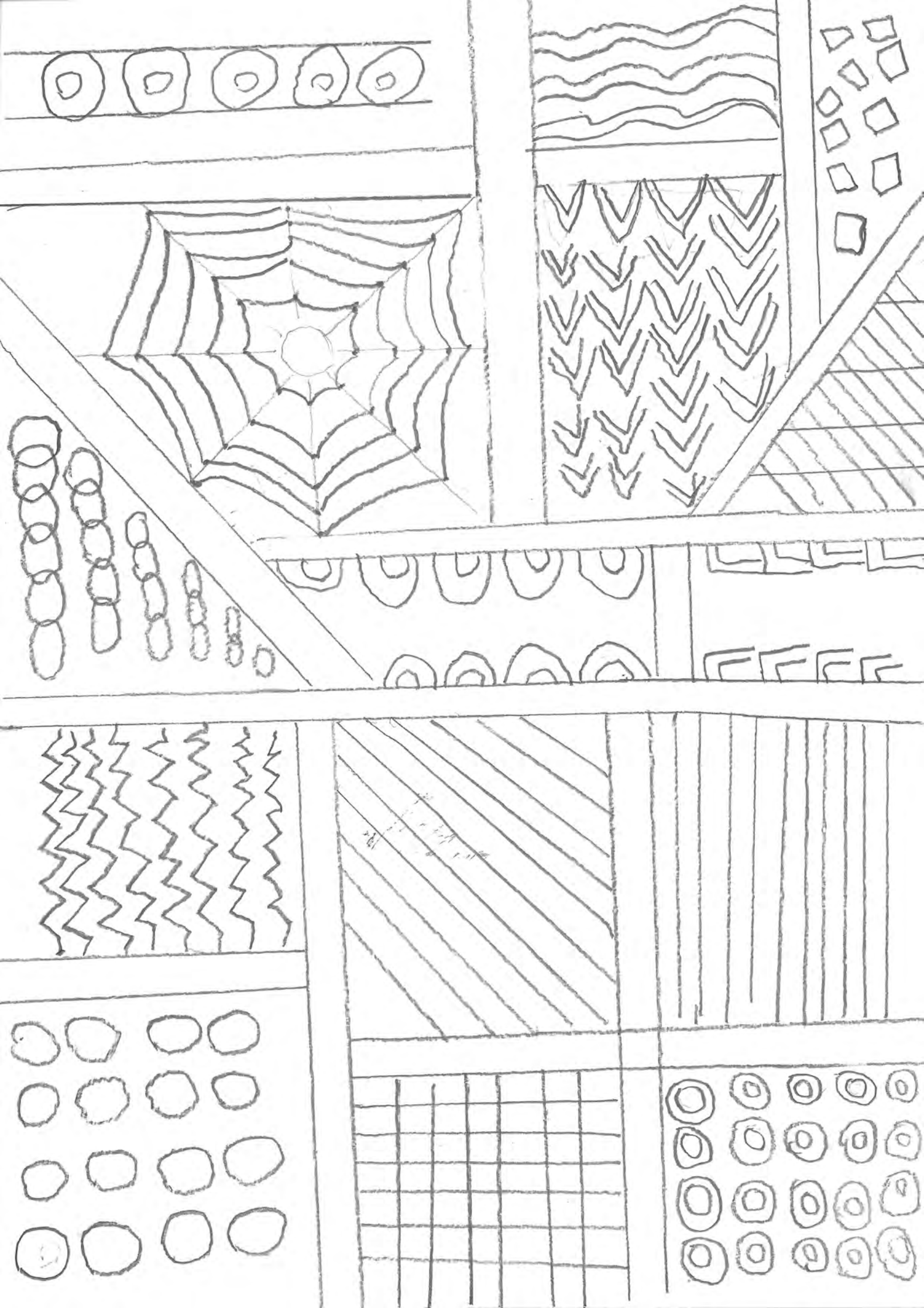


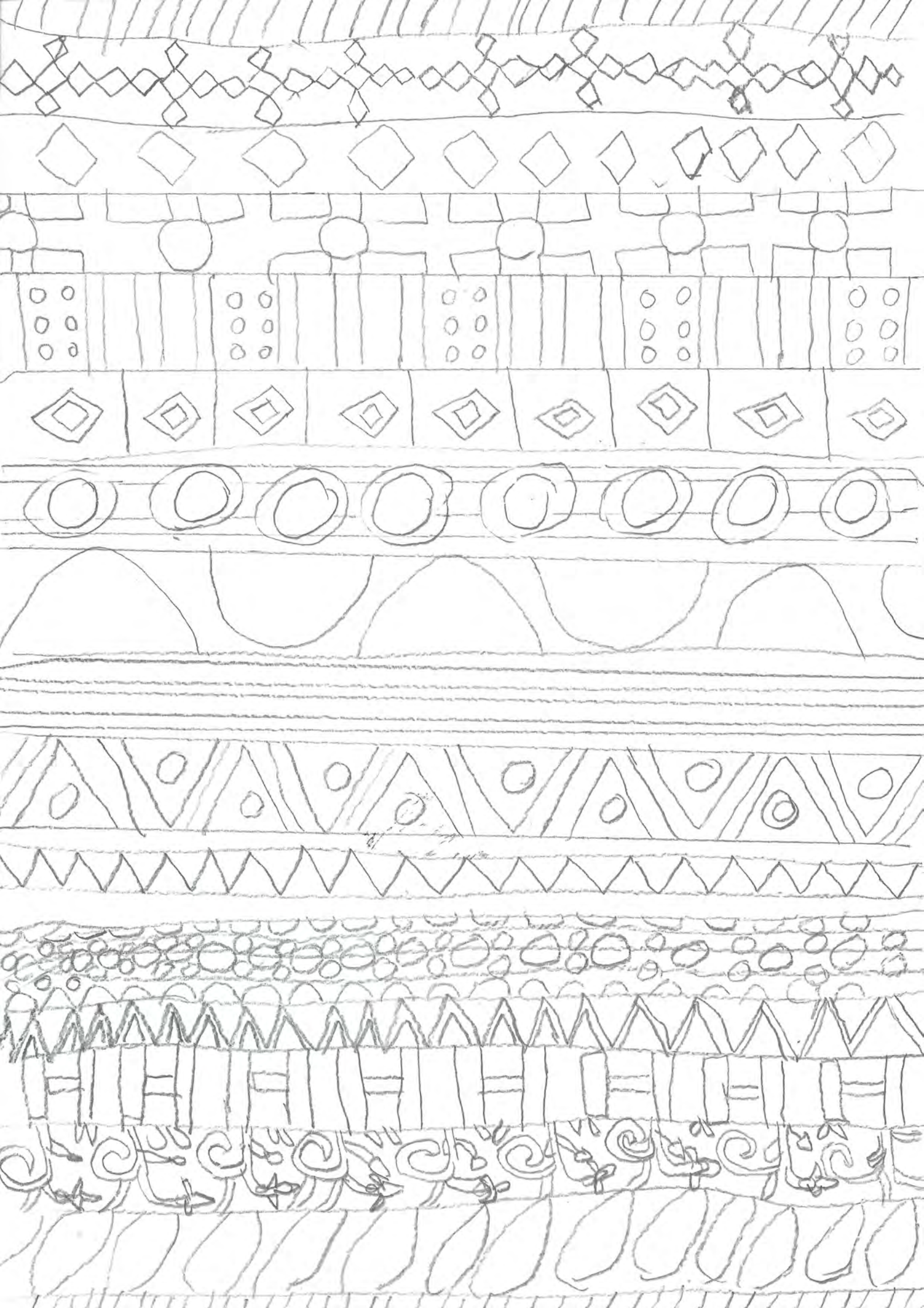






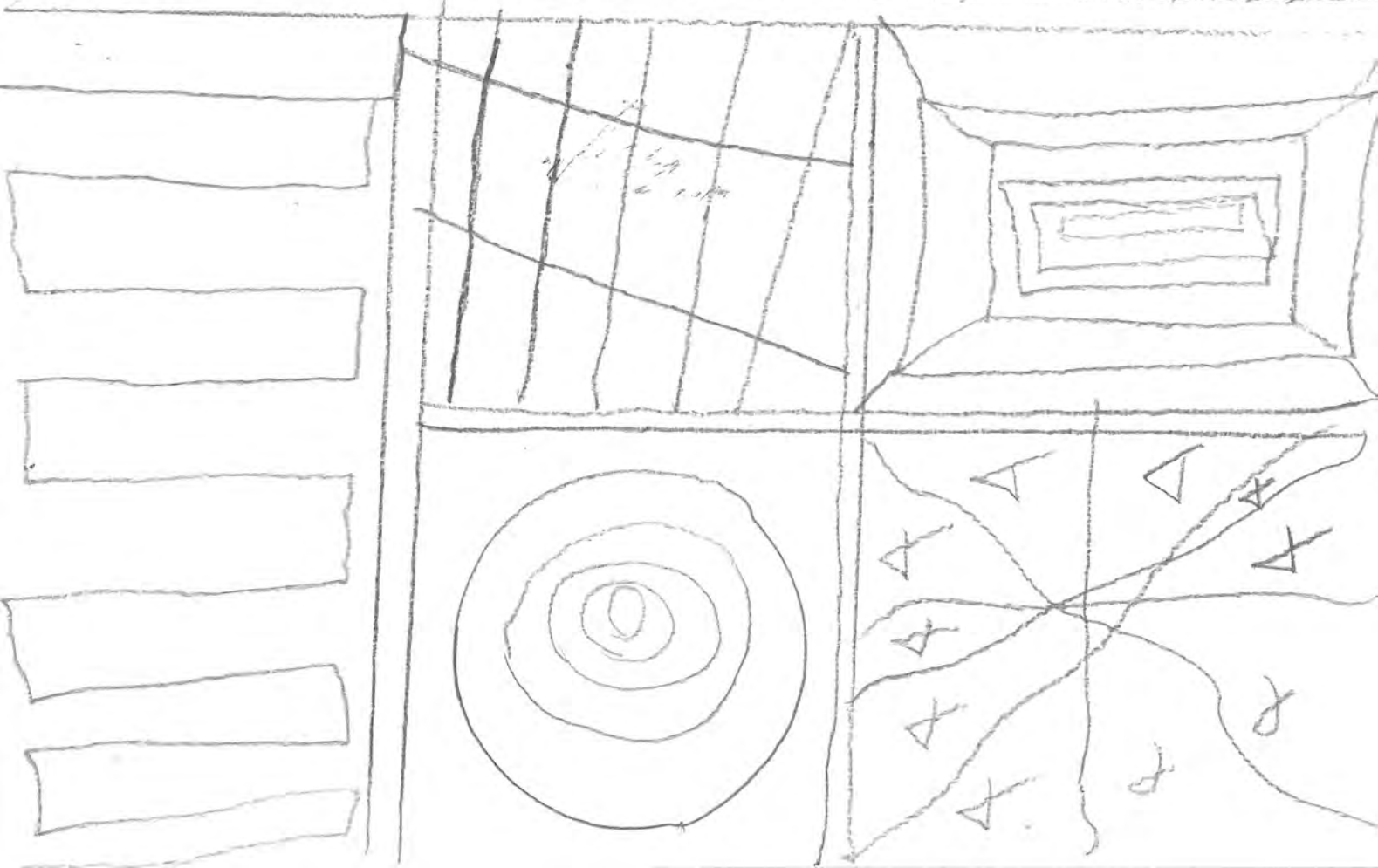
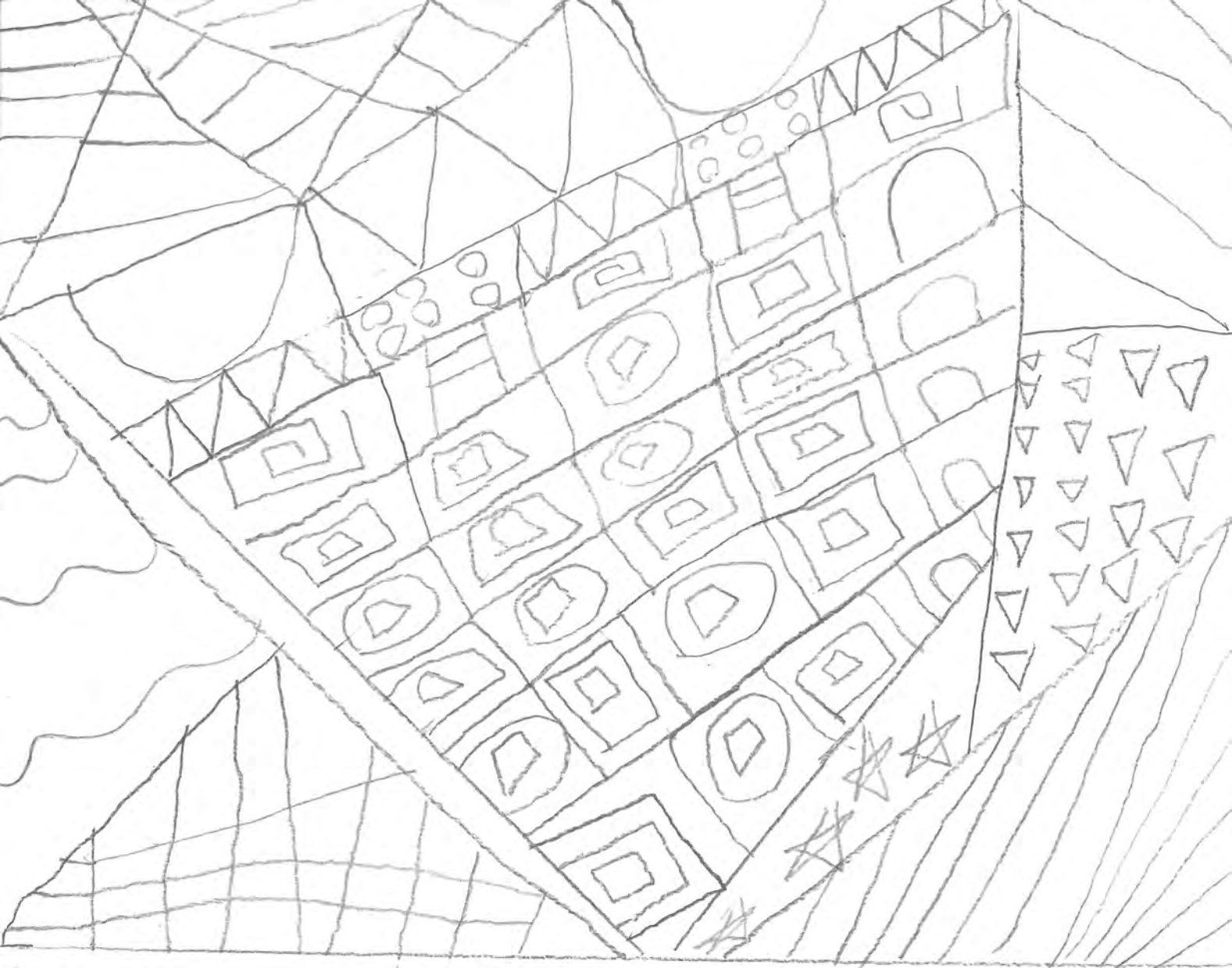


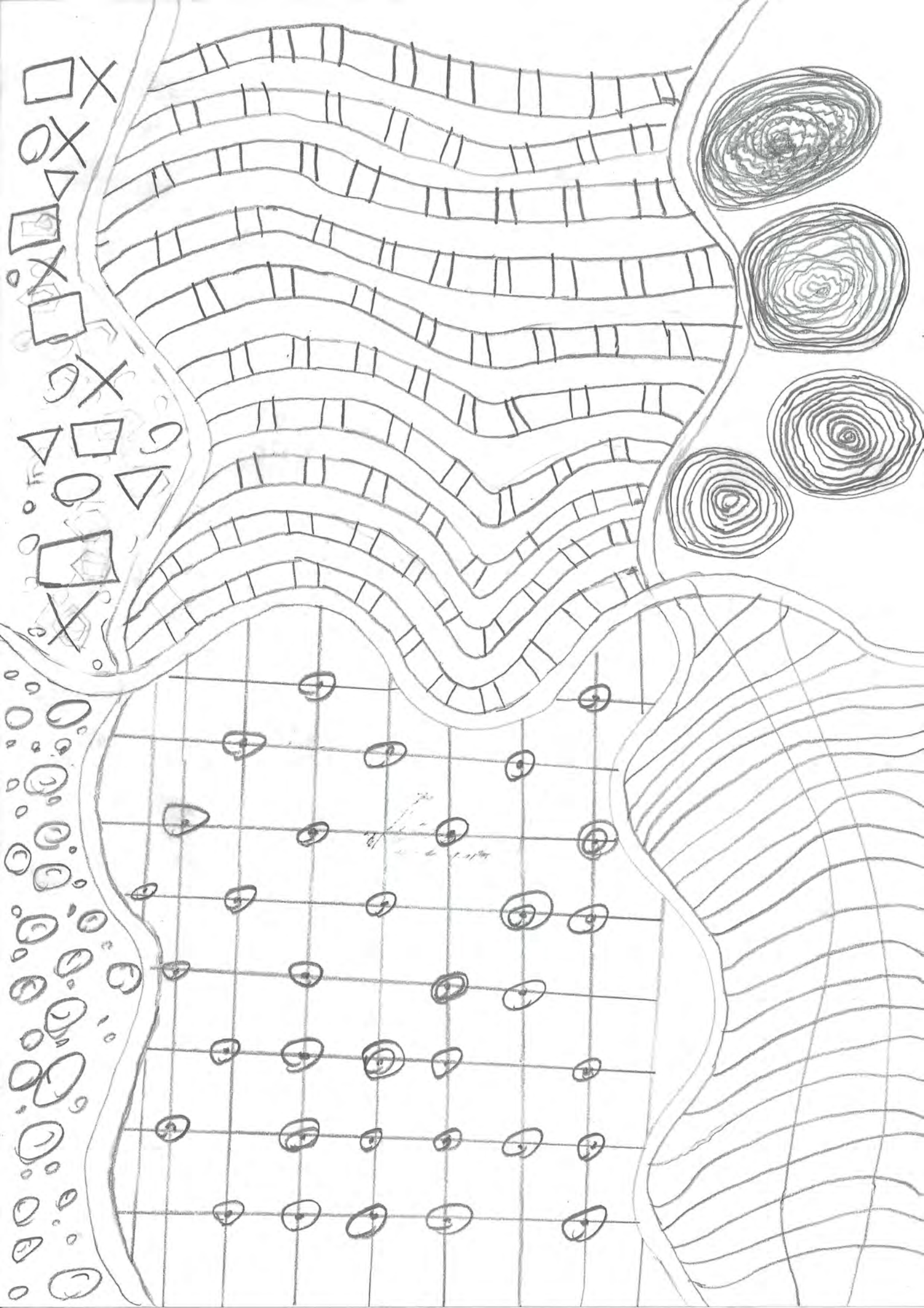




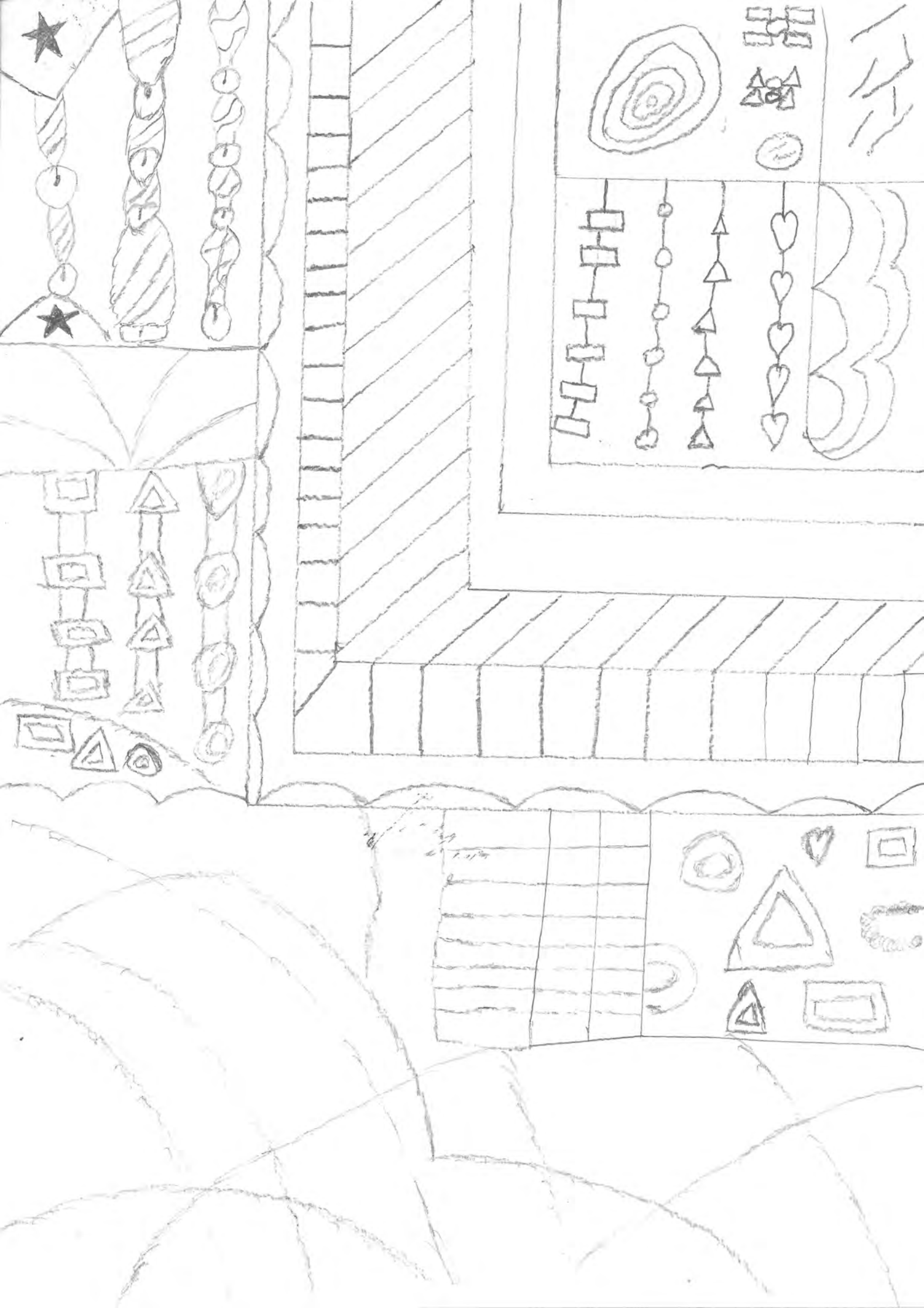


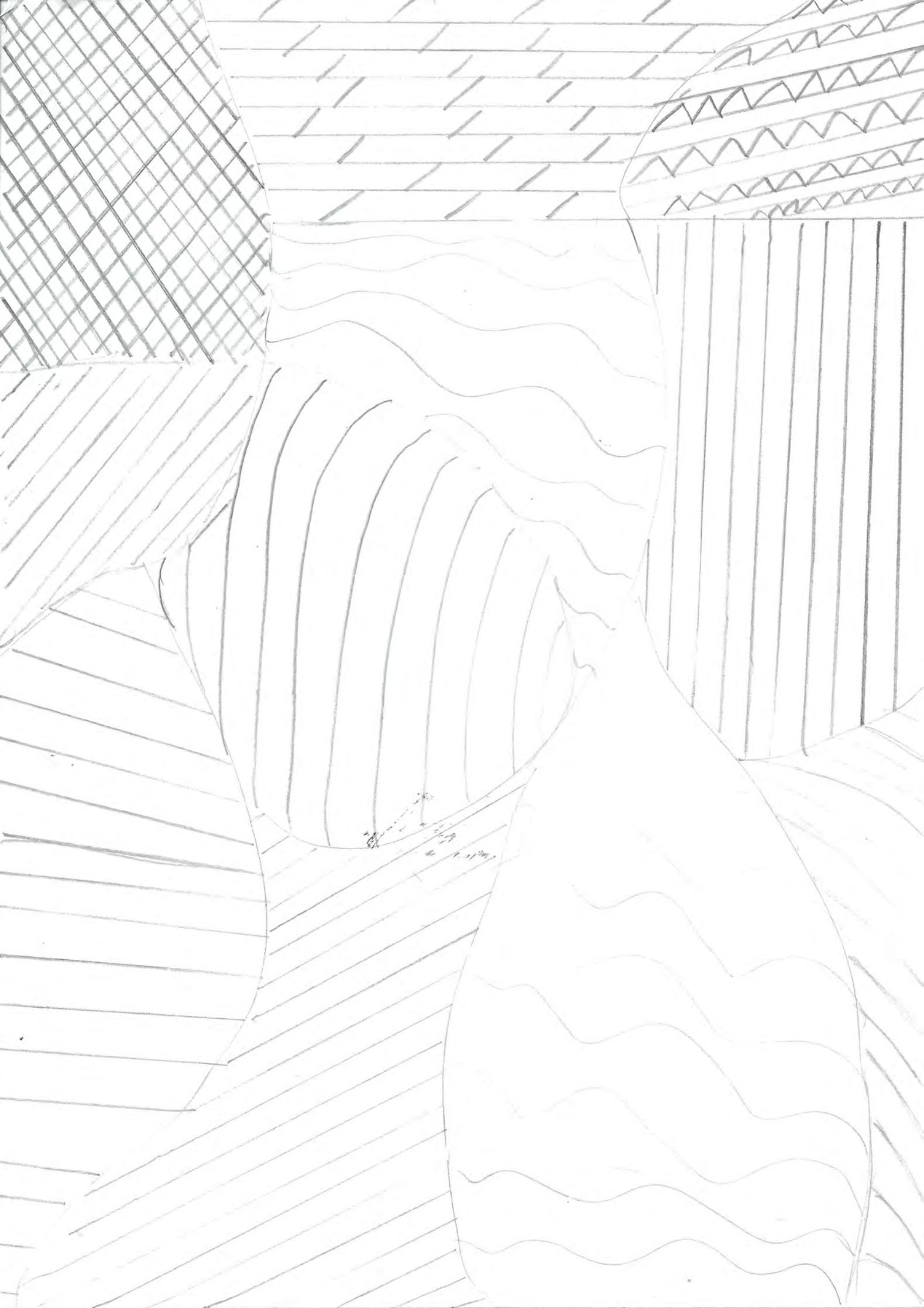


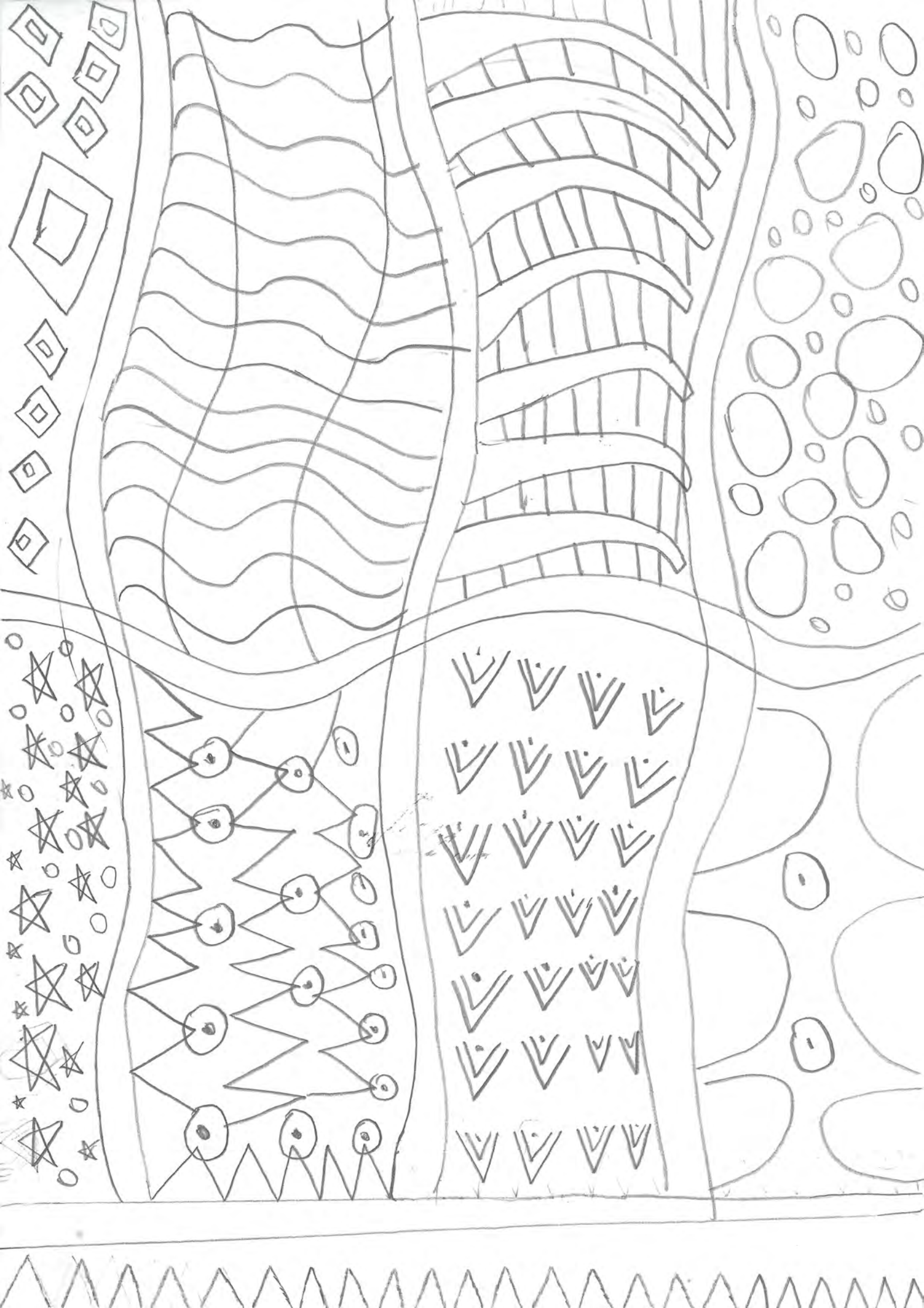




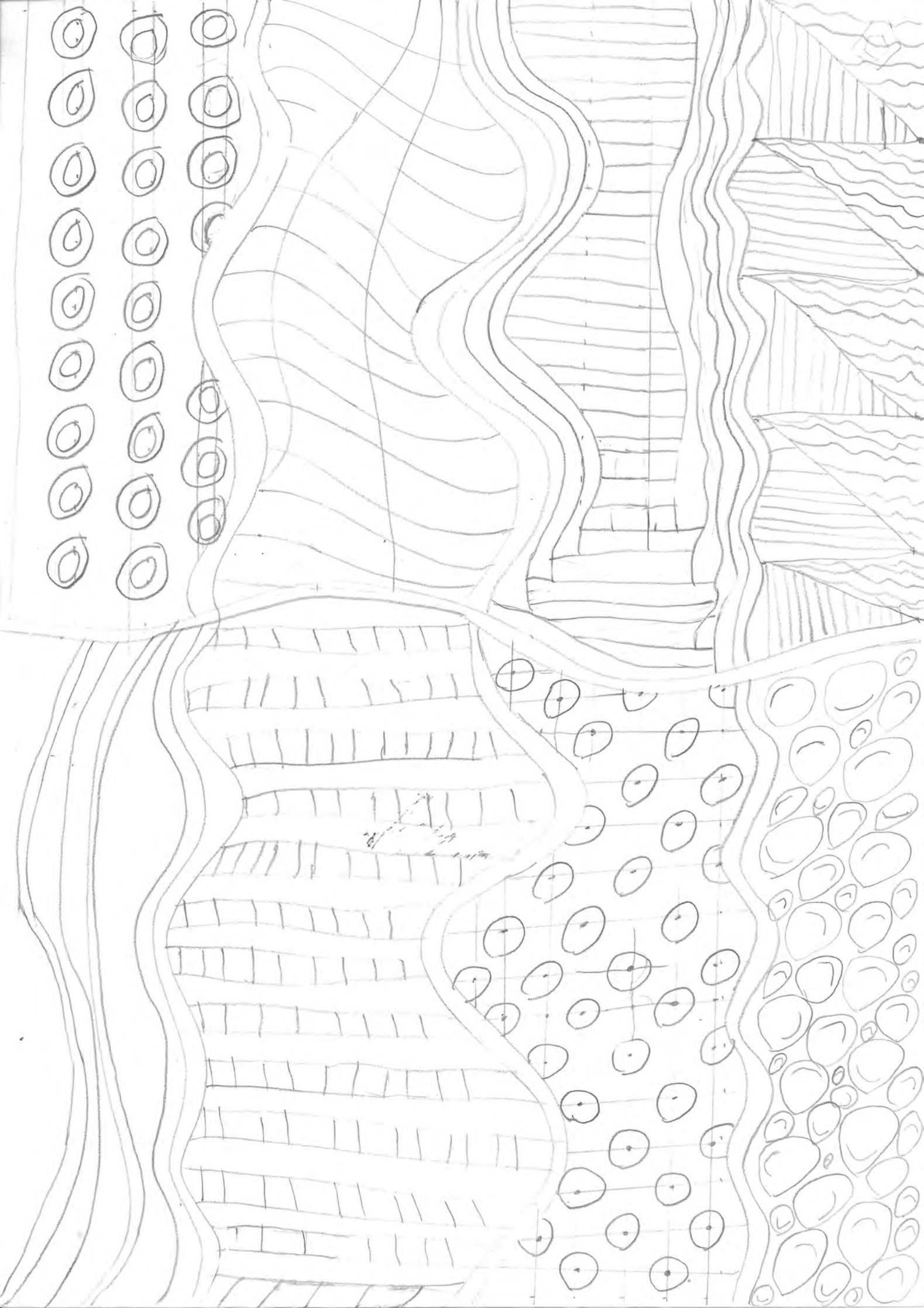


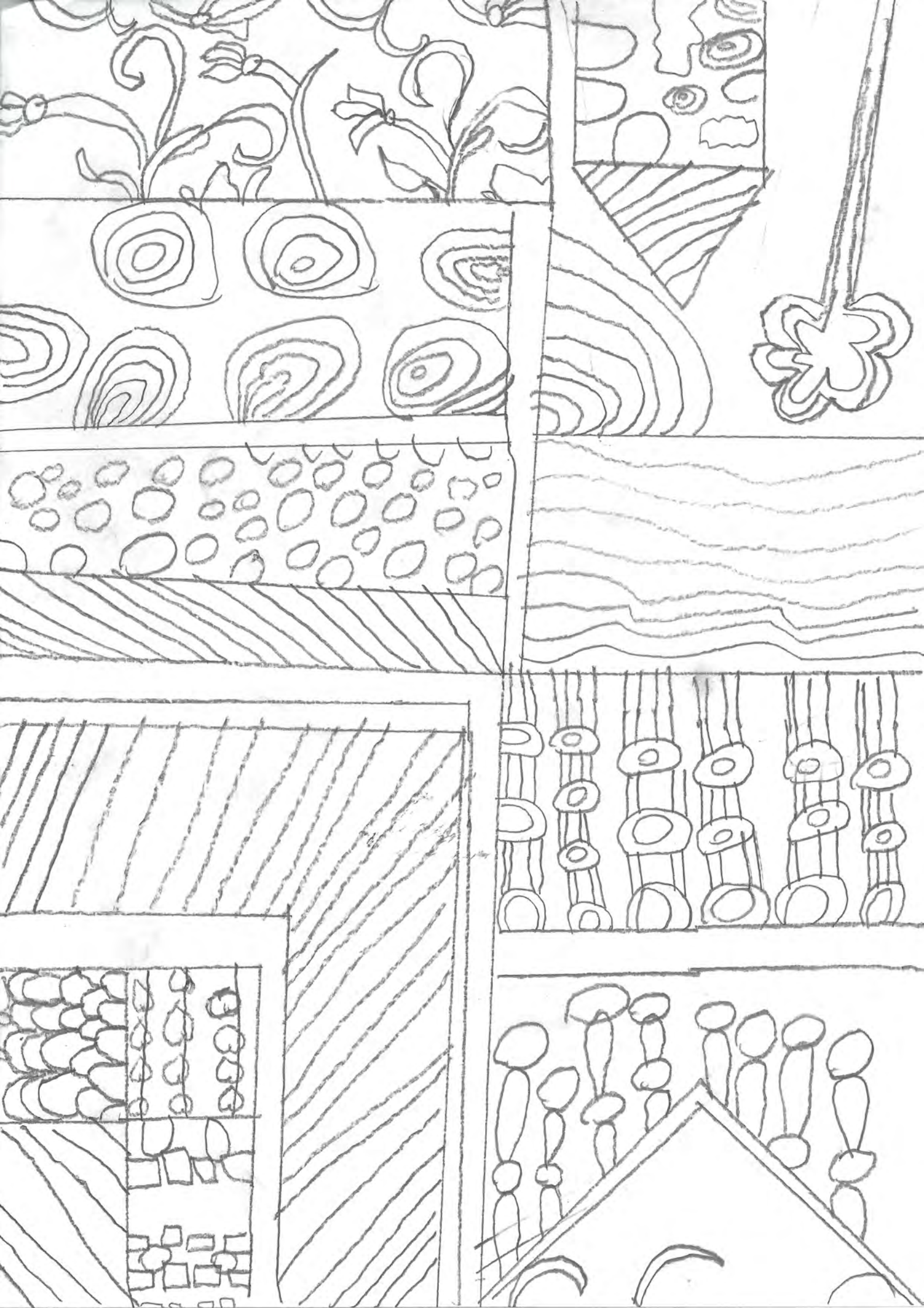








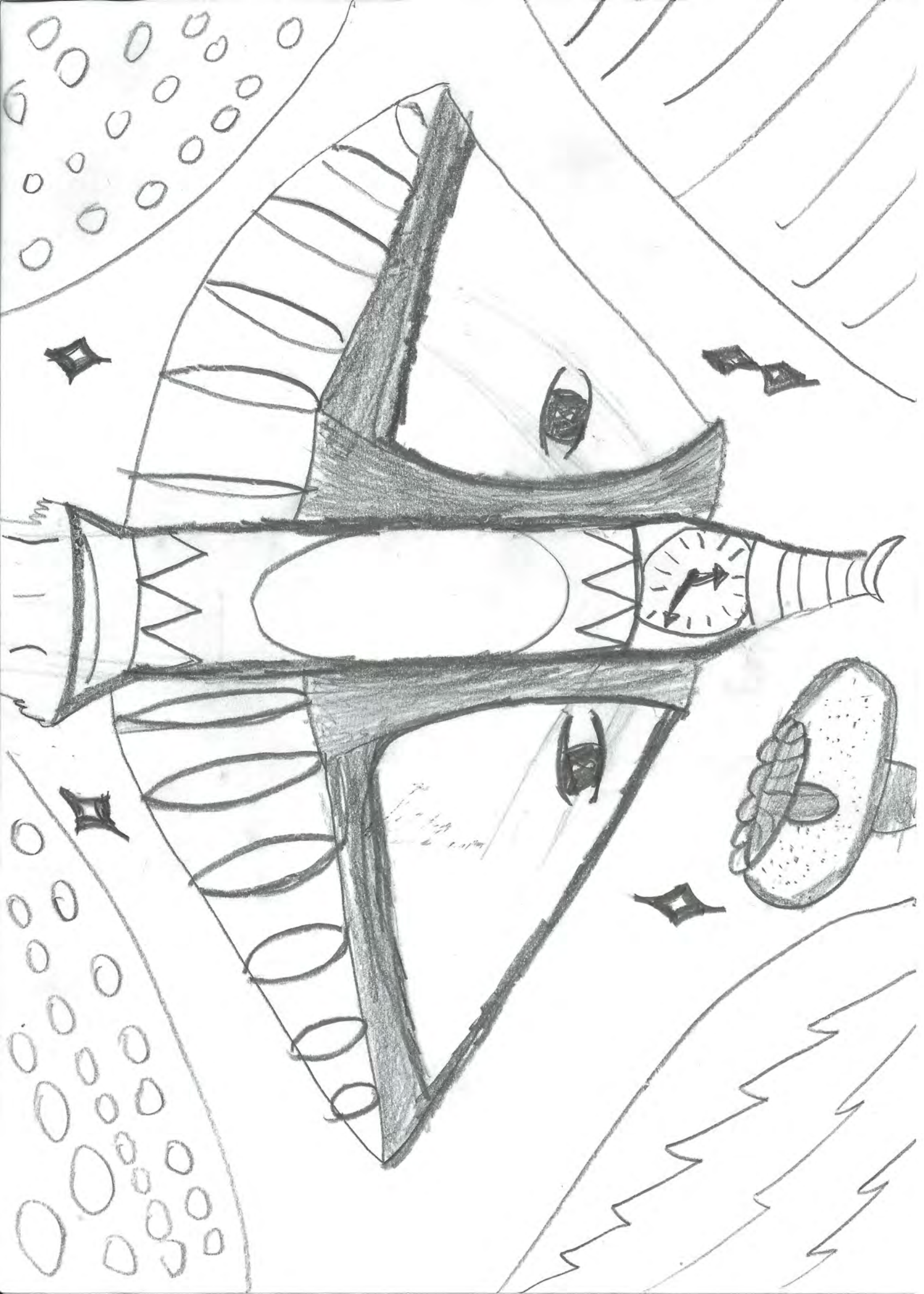




## **Experiment 5**

Experiment 5 involved testing engagement in combination with evaluation and excluded instruction. Although instruction was not tested here, a minimal level of instruction was involved. The design brief in this experiment will not include themes as instruction was not tested.



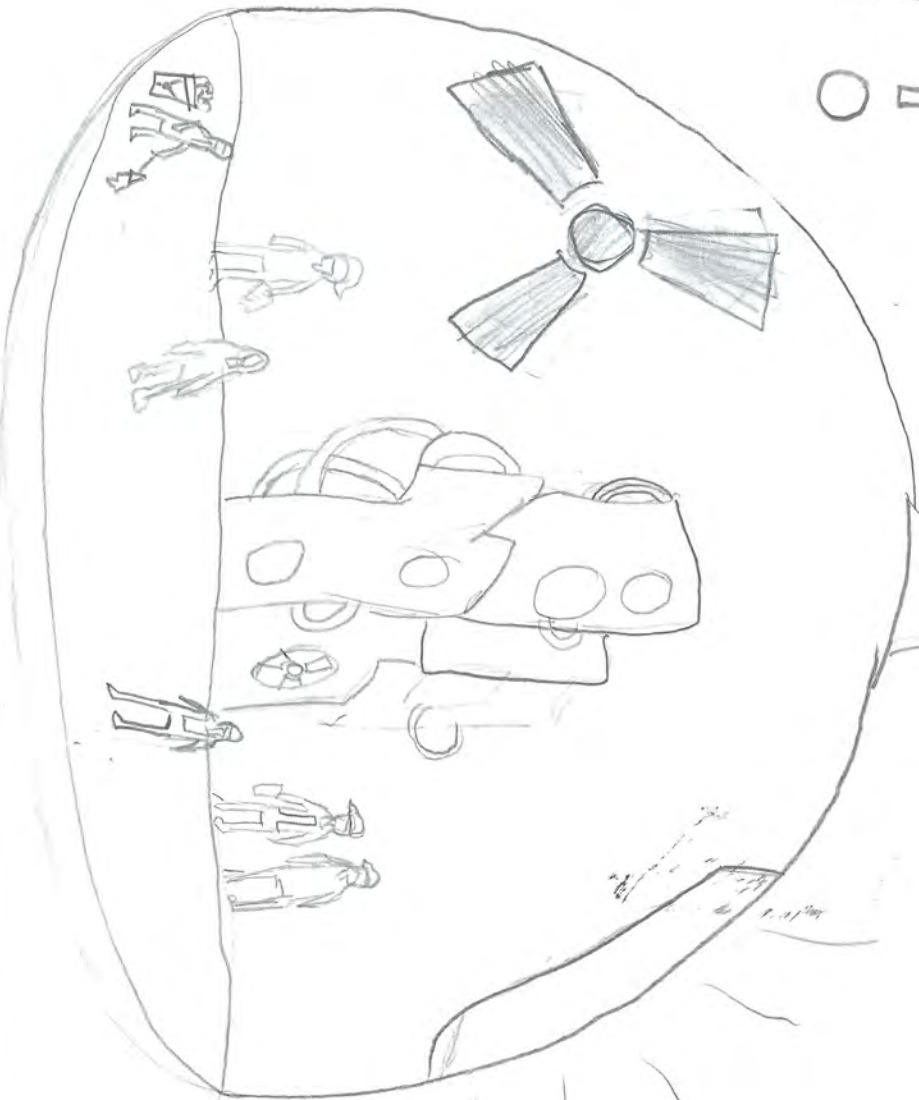






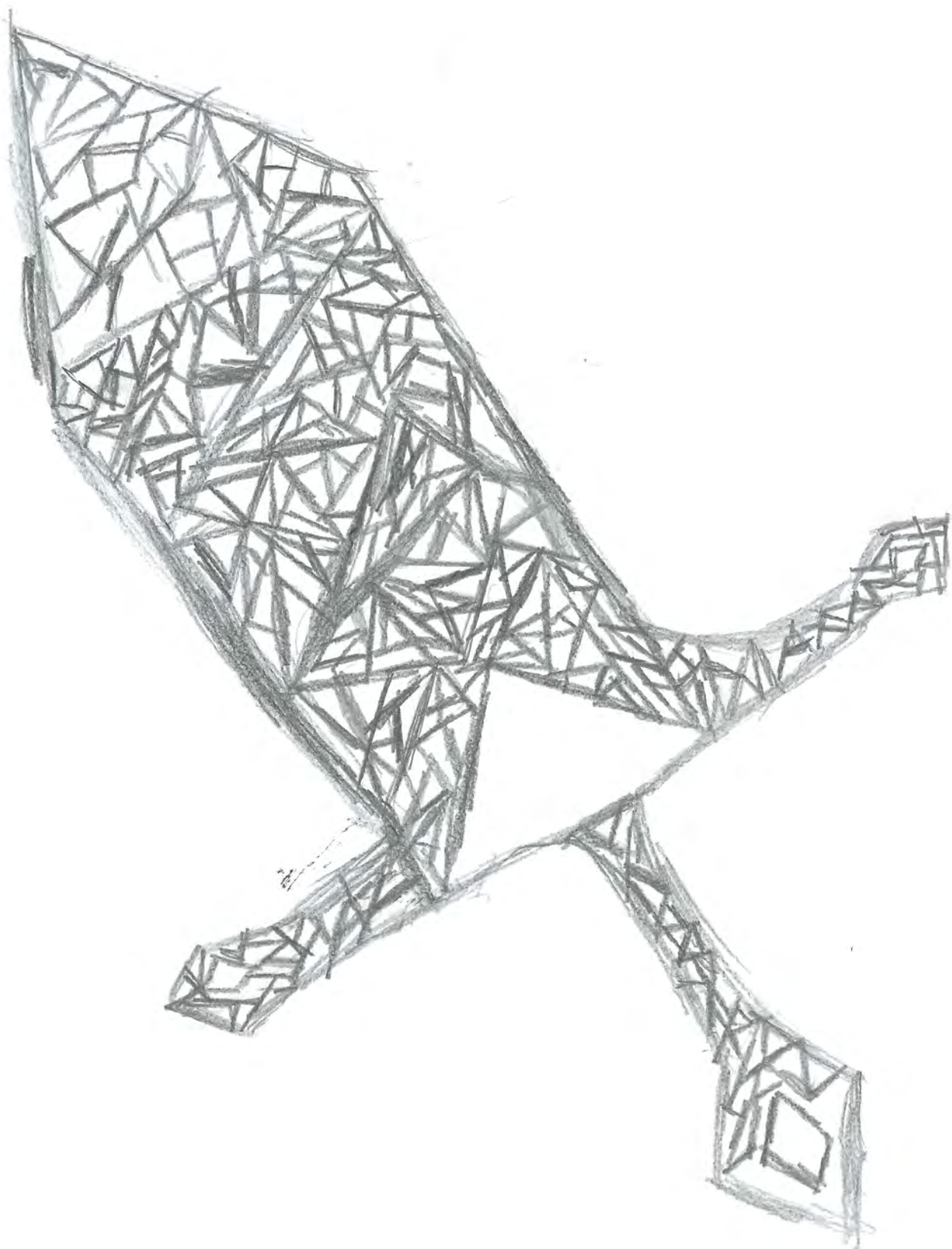
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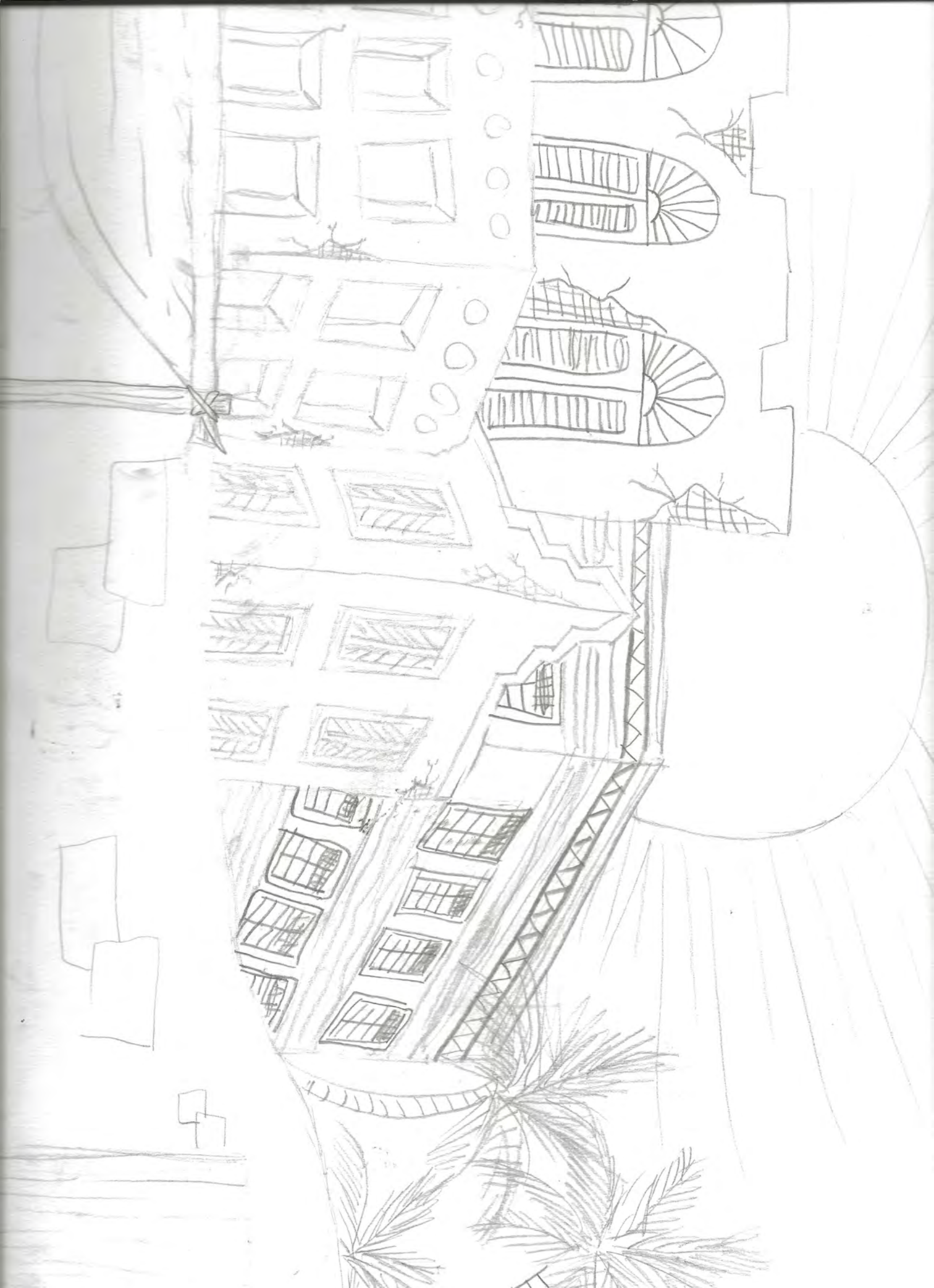




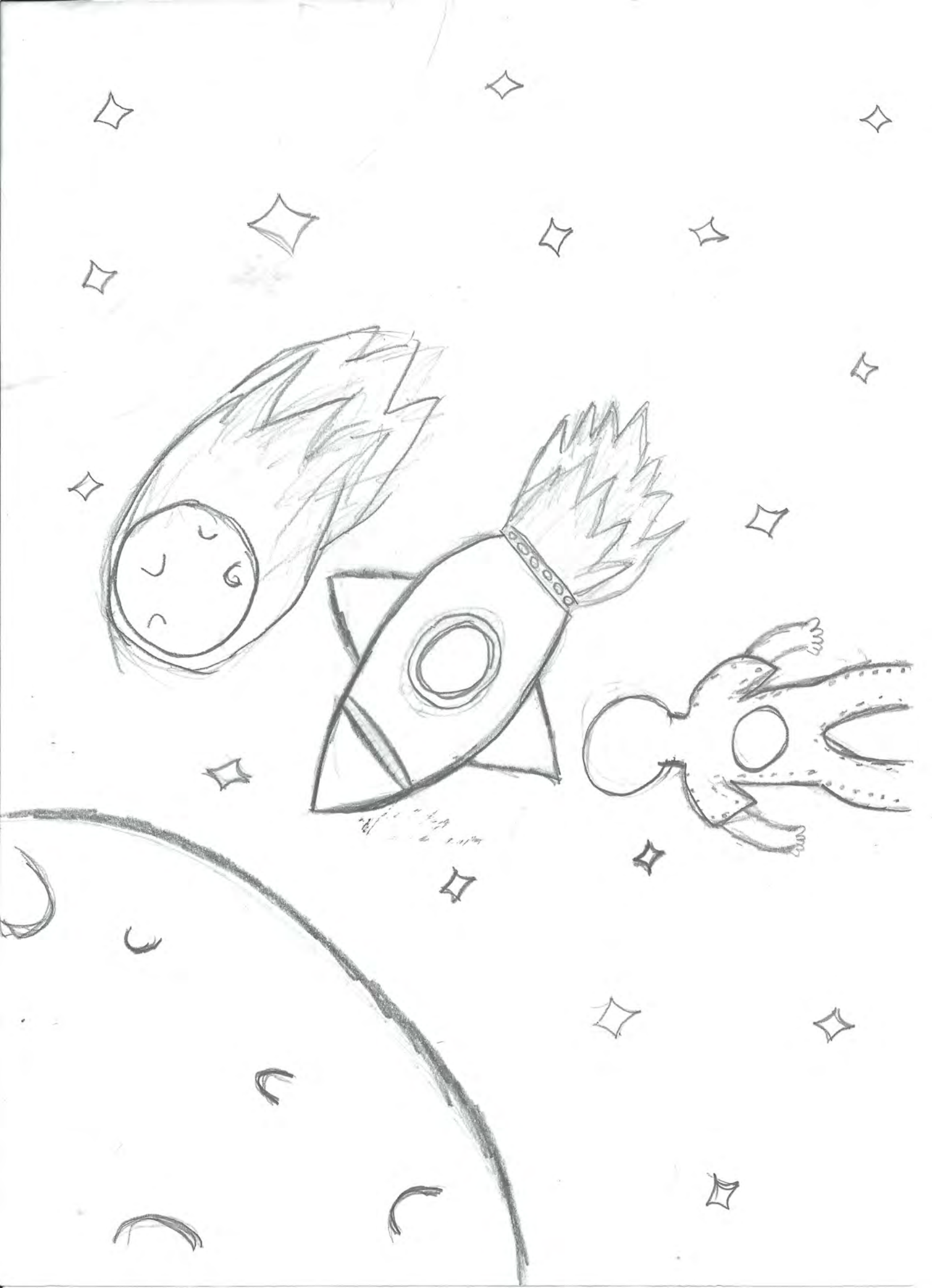




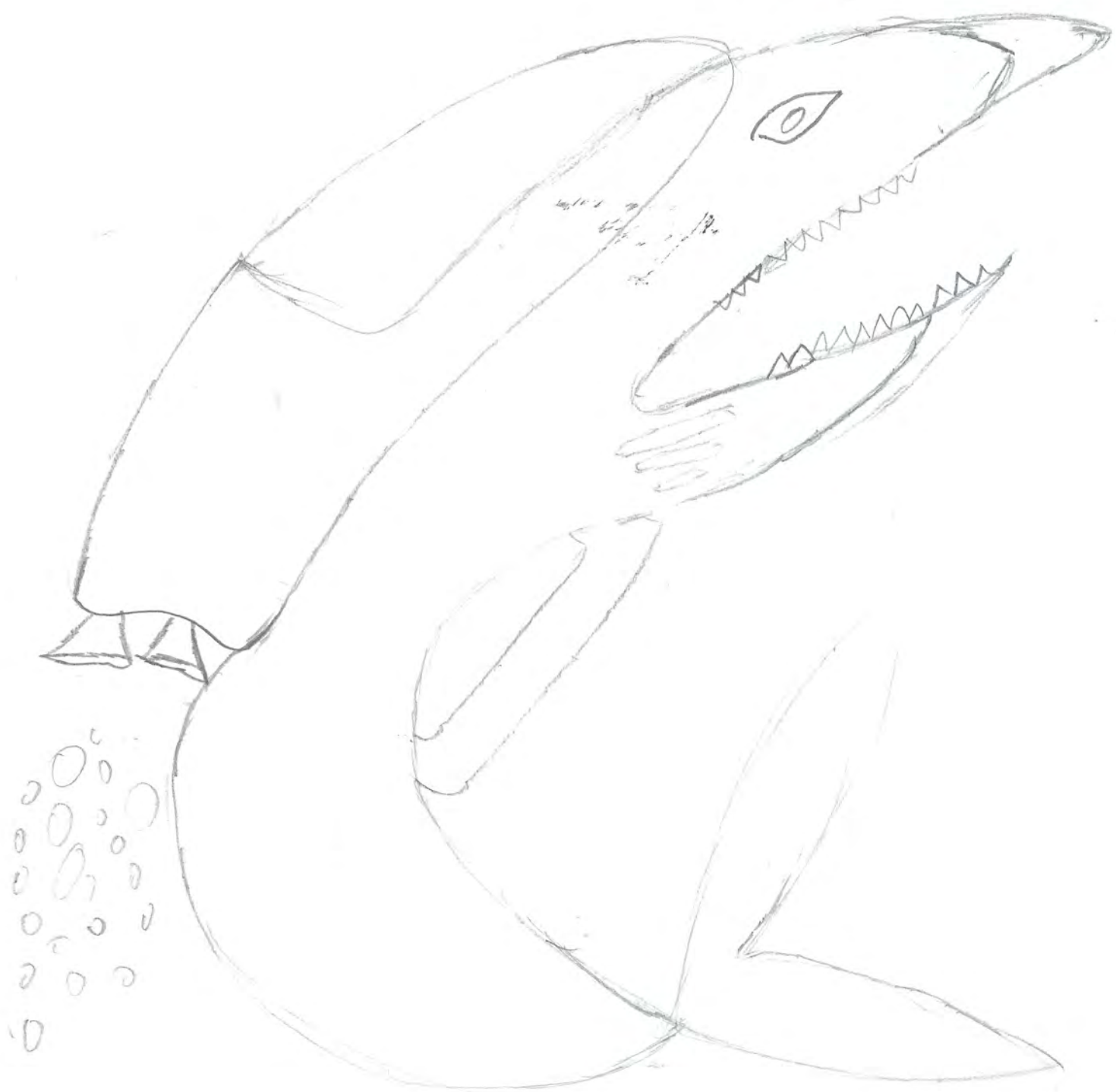




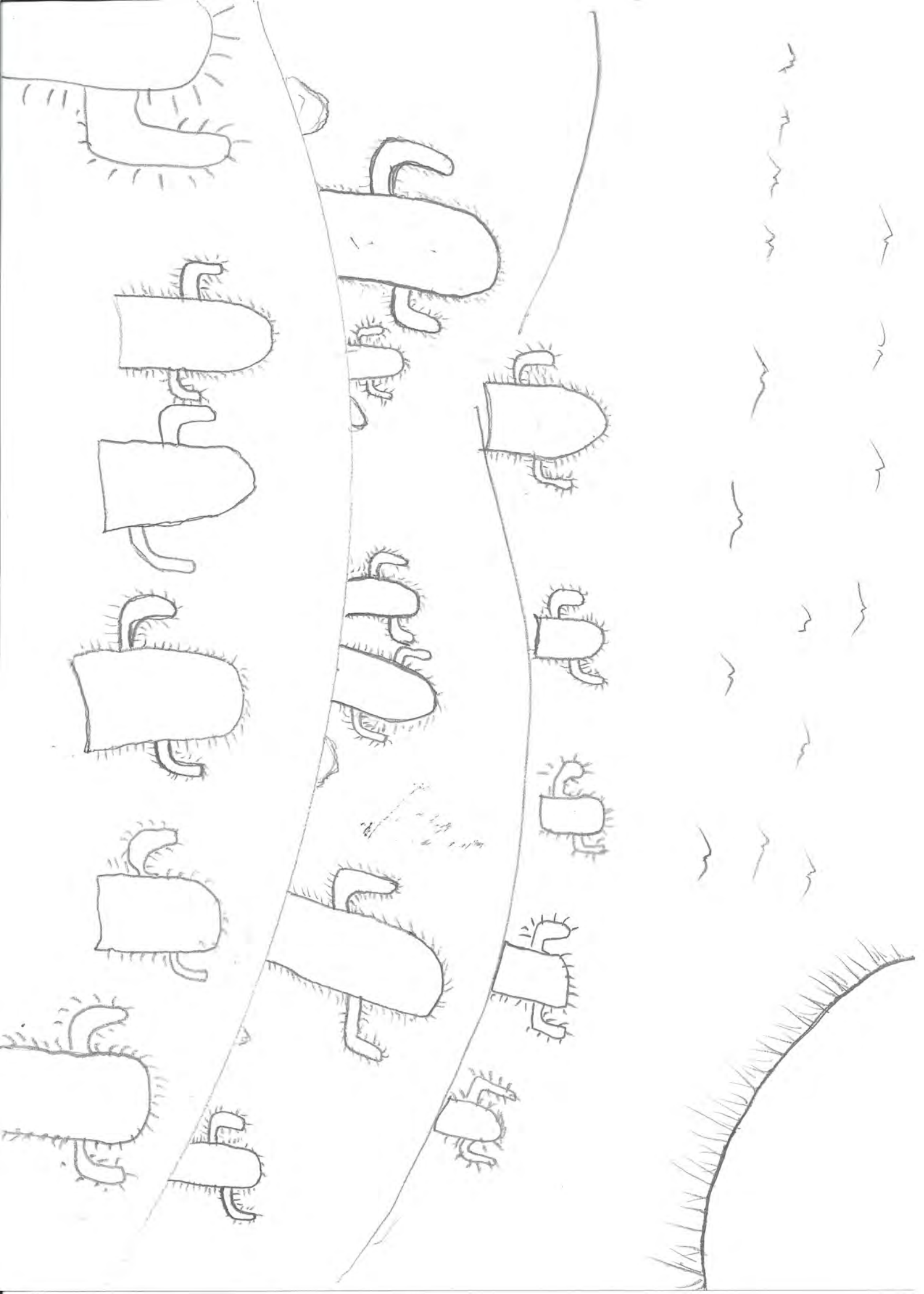


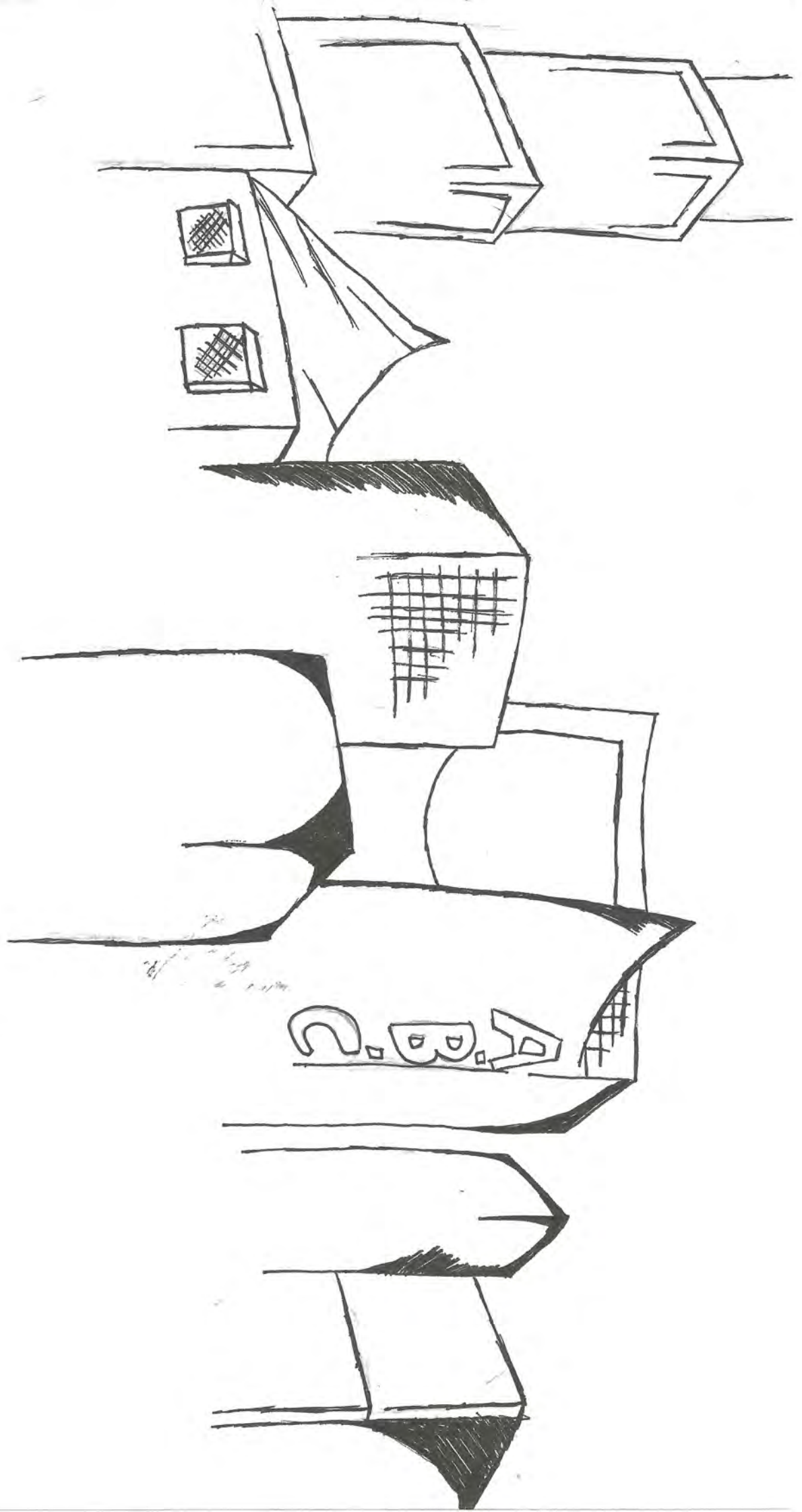












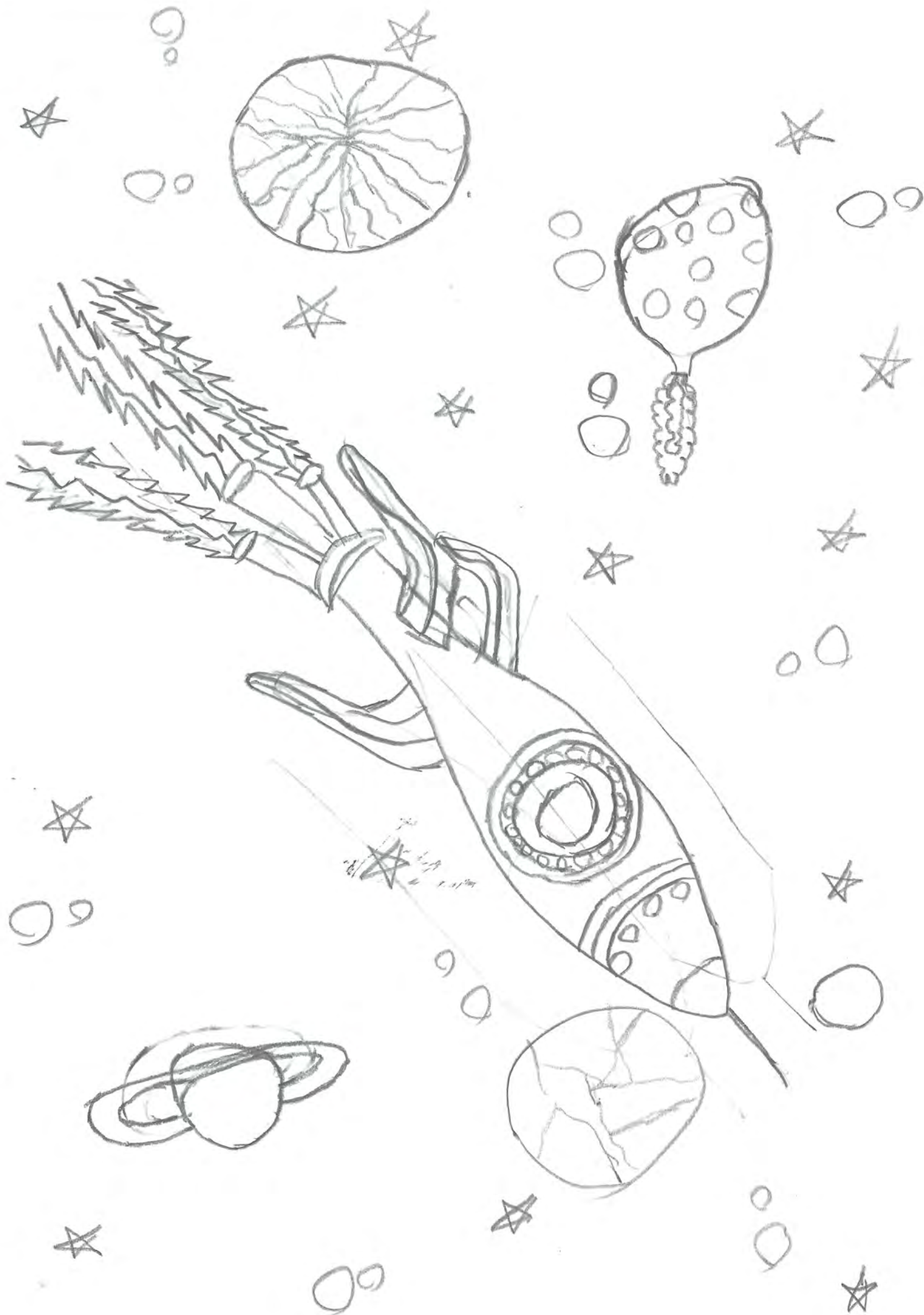


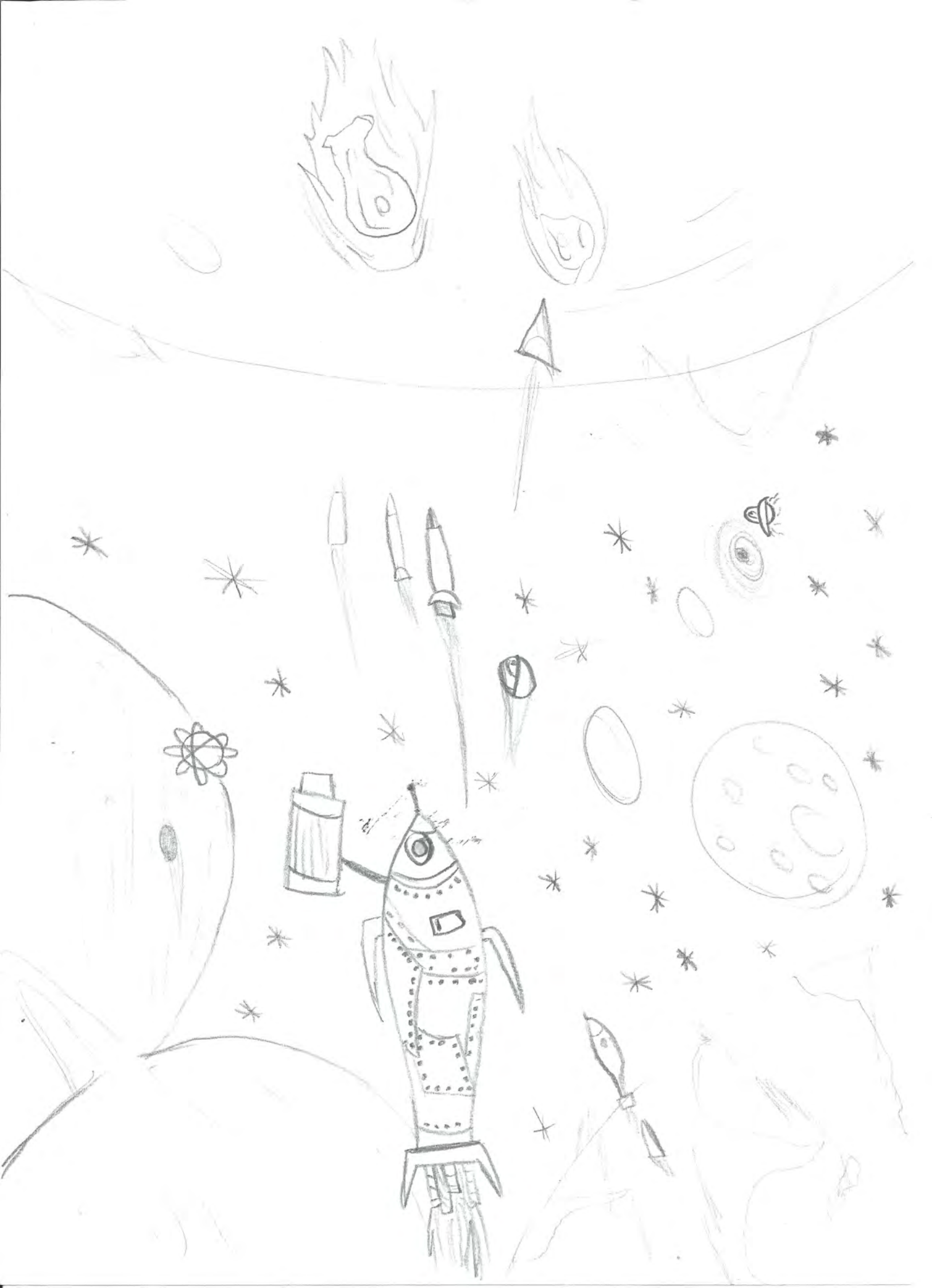
الرسالة المشتملة



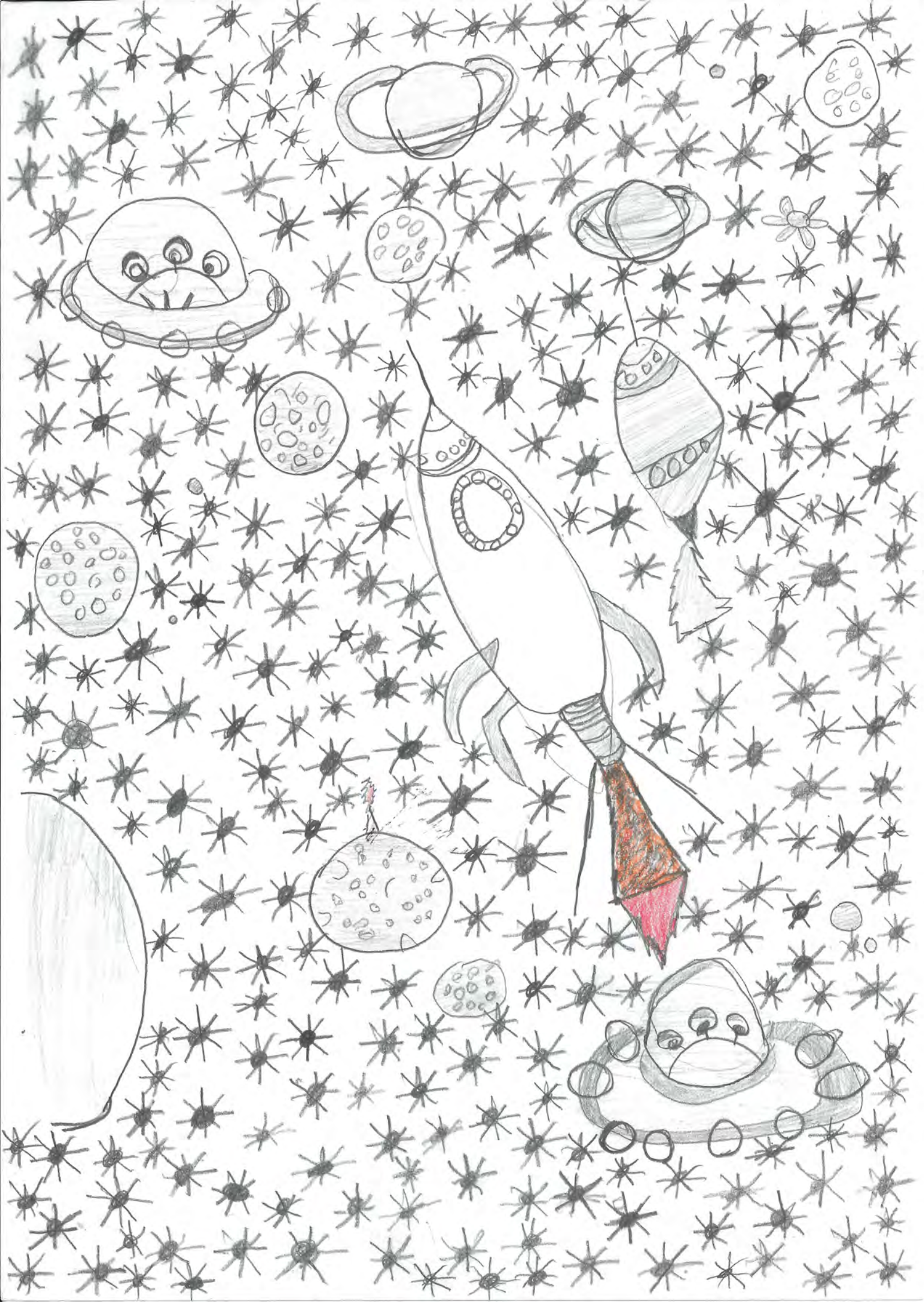










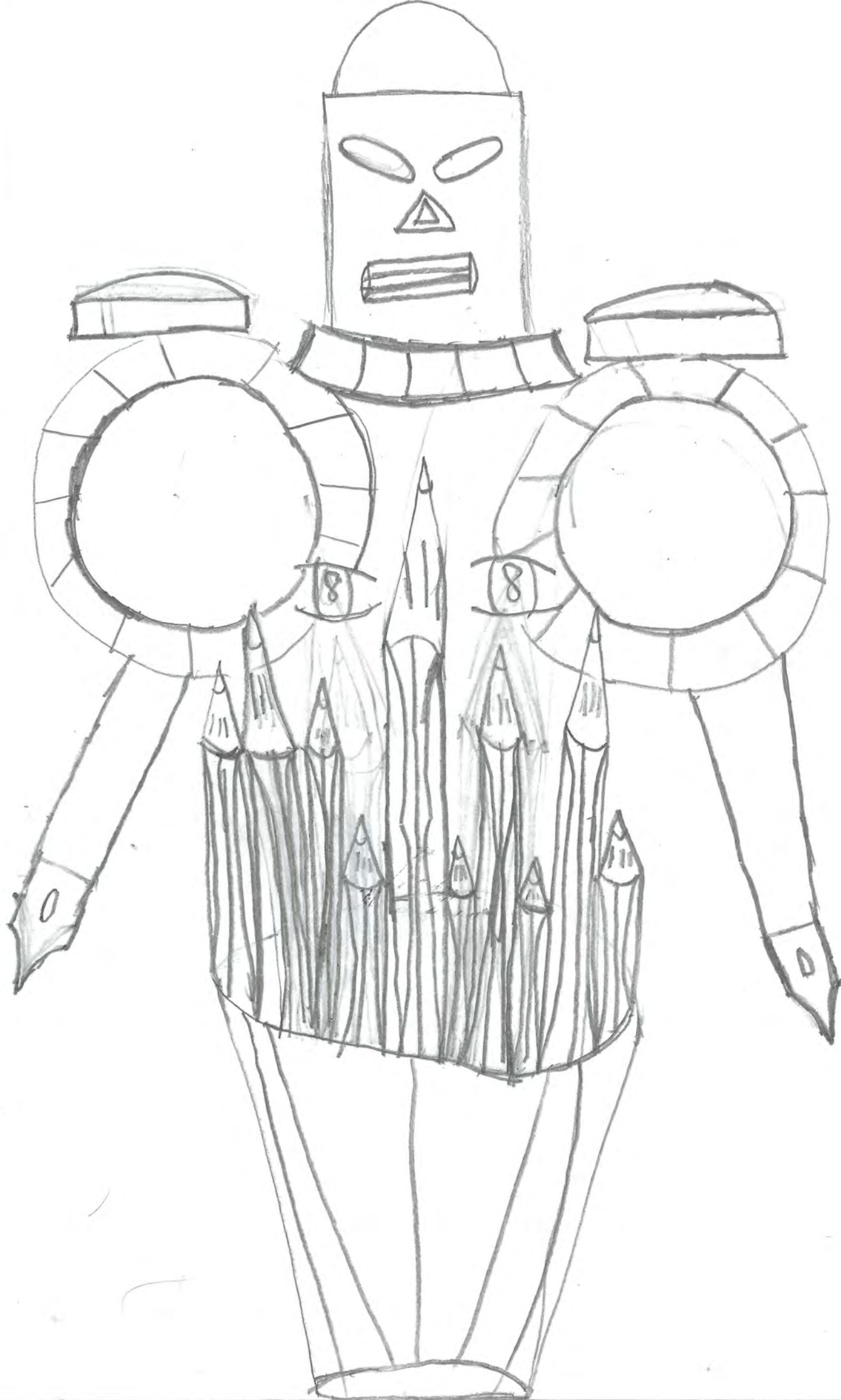




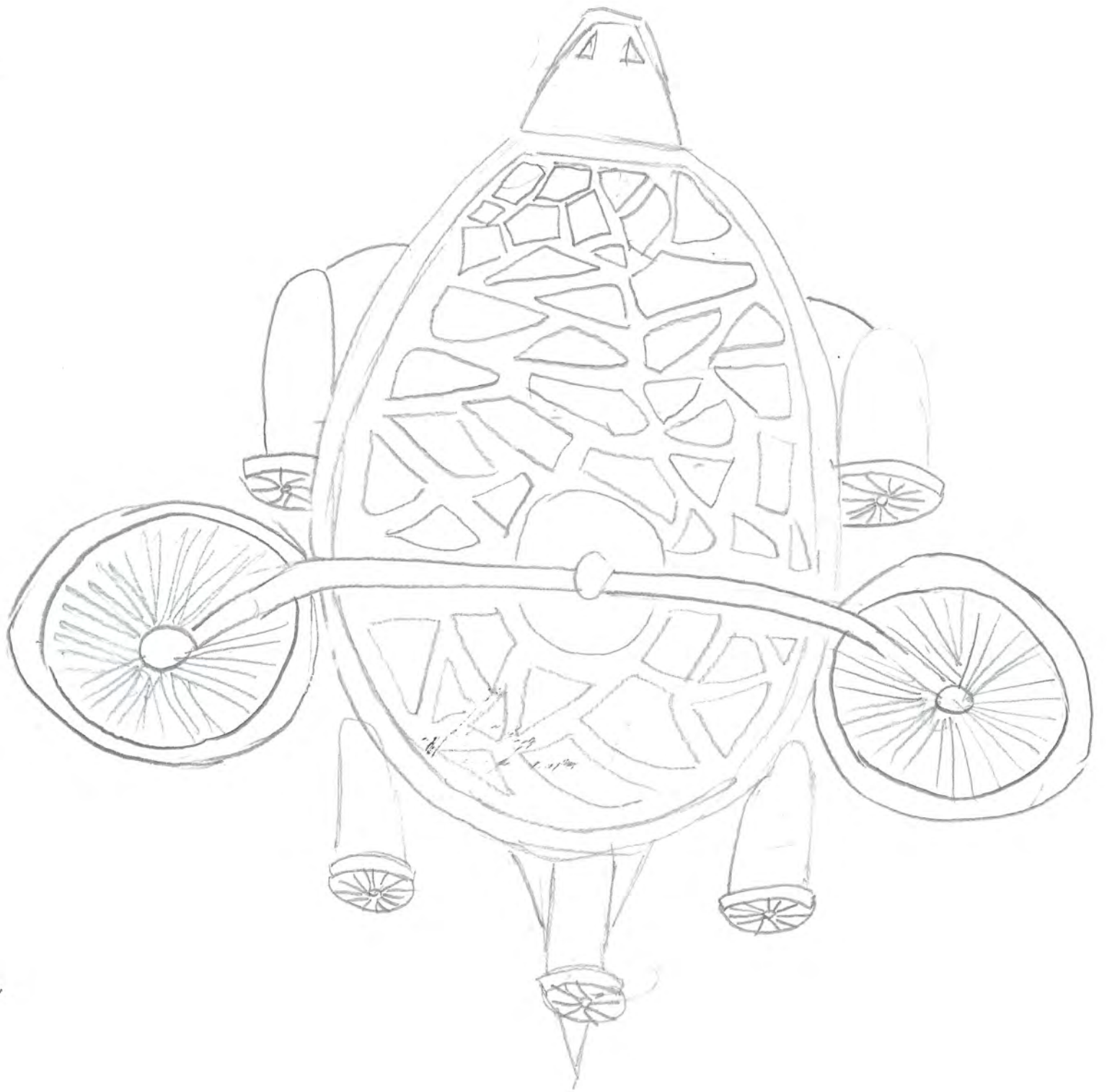


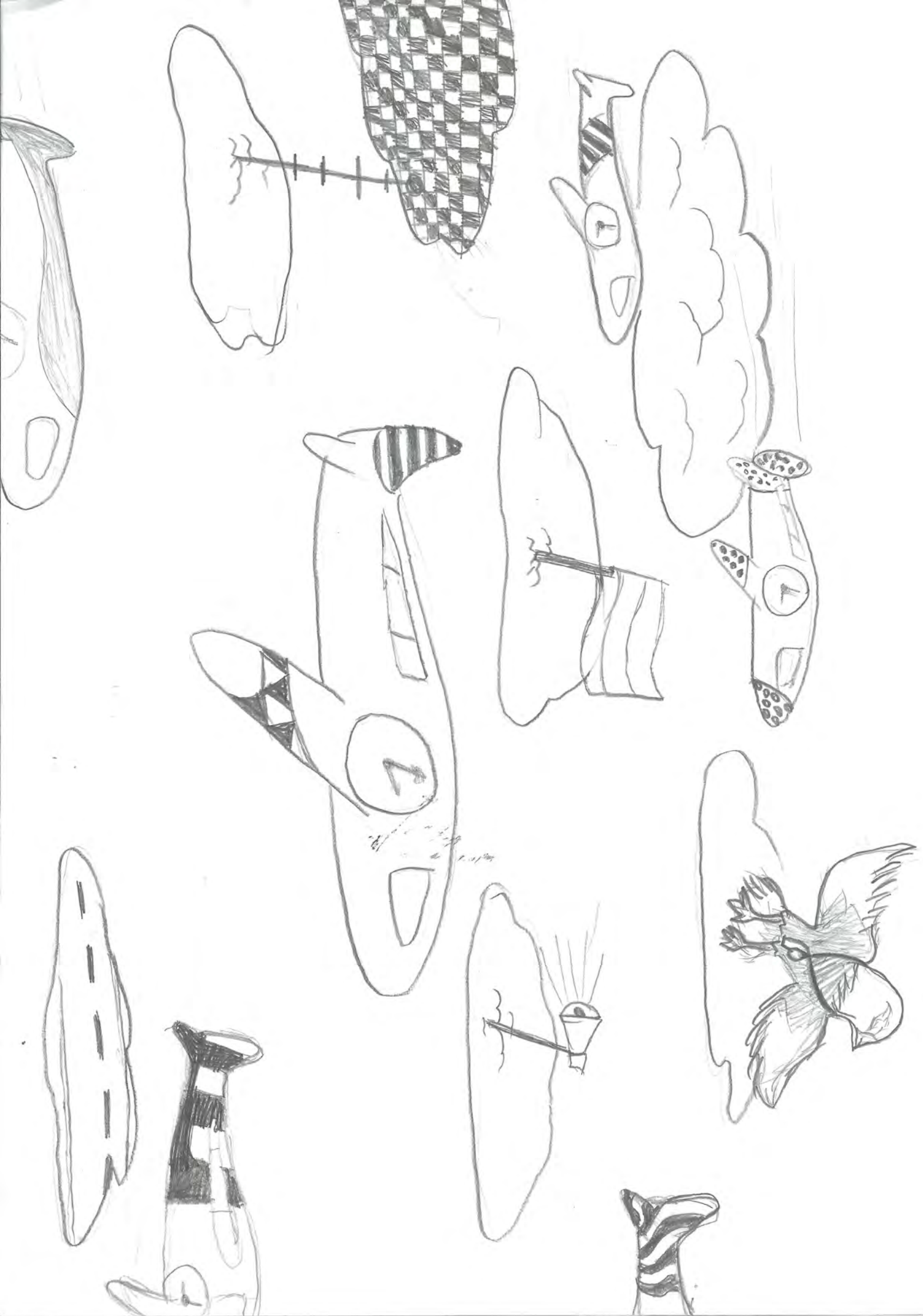
## **Experiment 6**

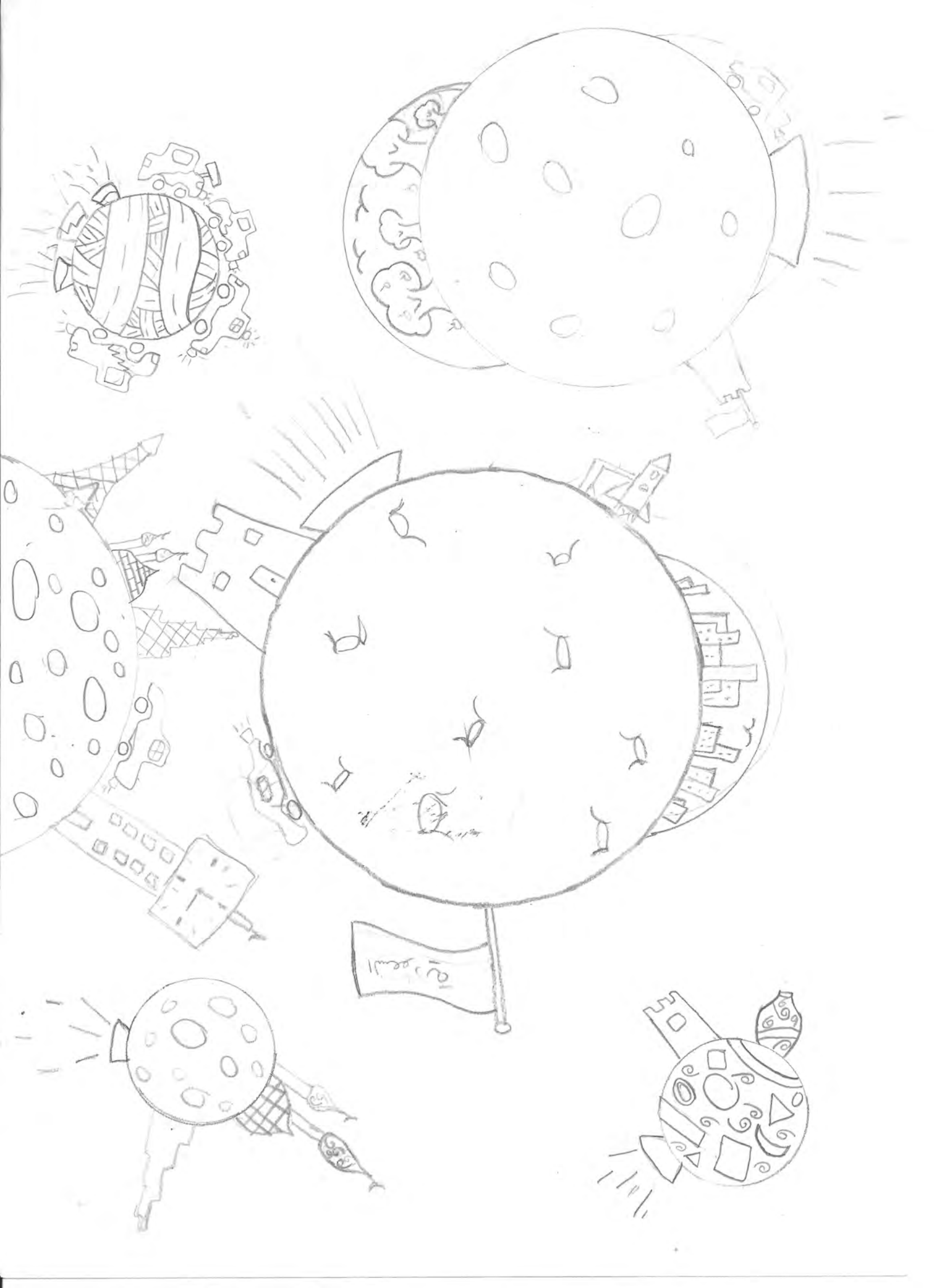
Experiment 6 tested for engagement only and excluded the other two variables. The design brief in this experiment will not include themes as instruction was not tested.

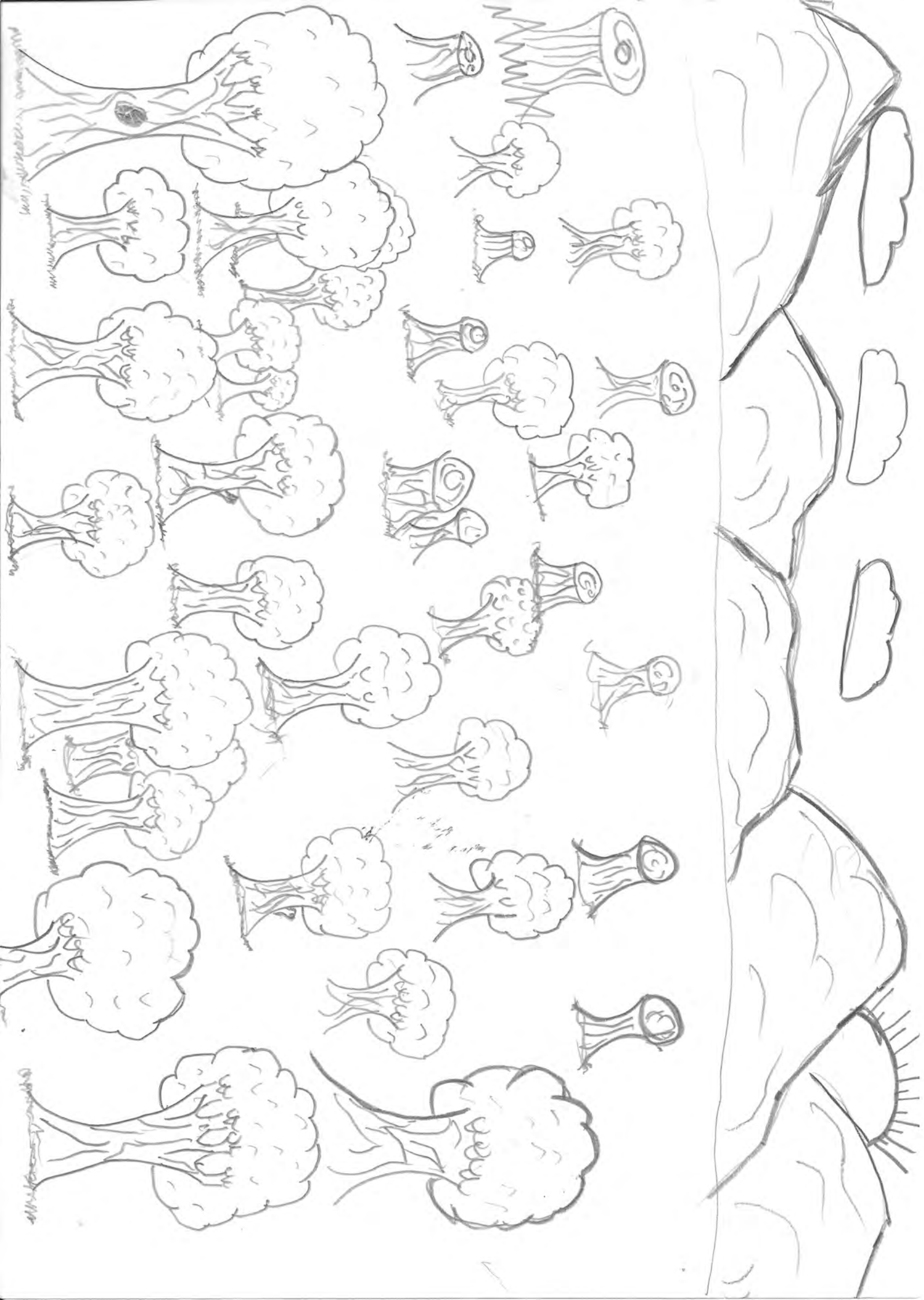


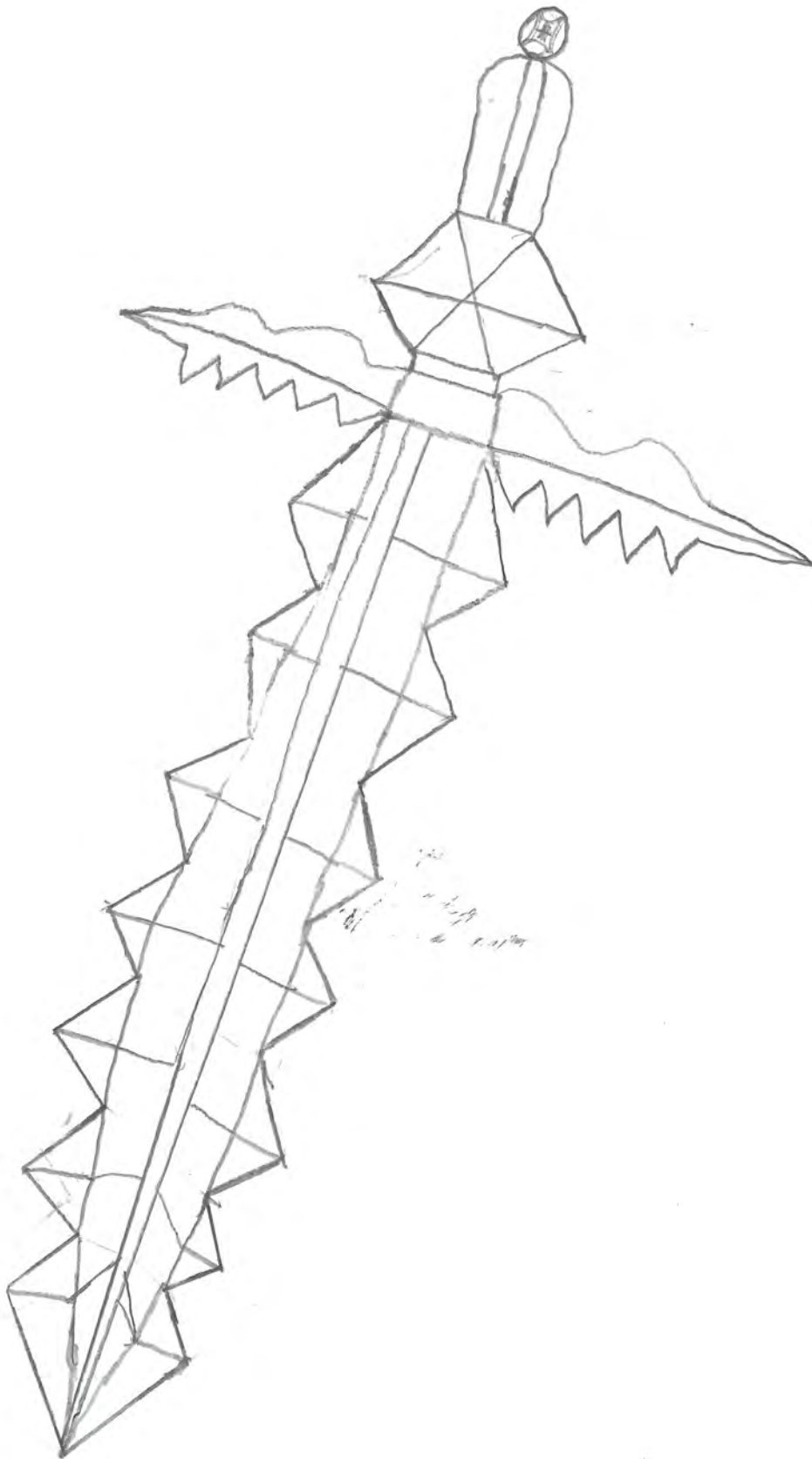




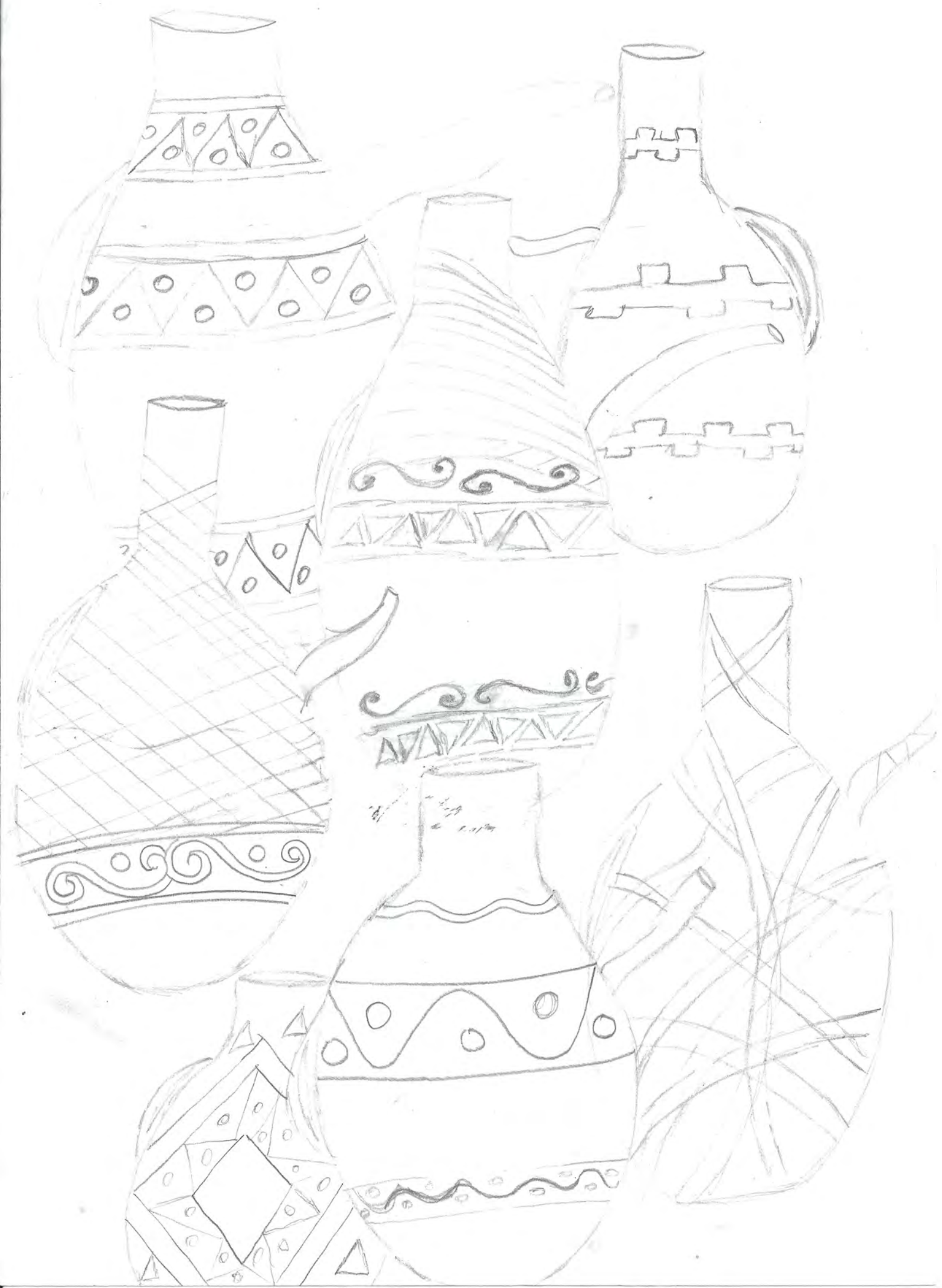


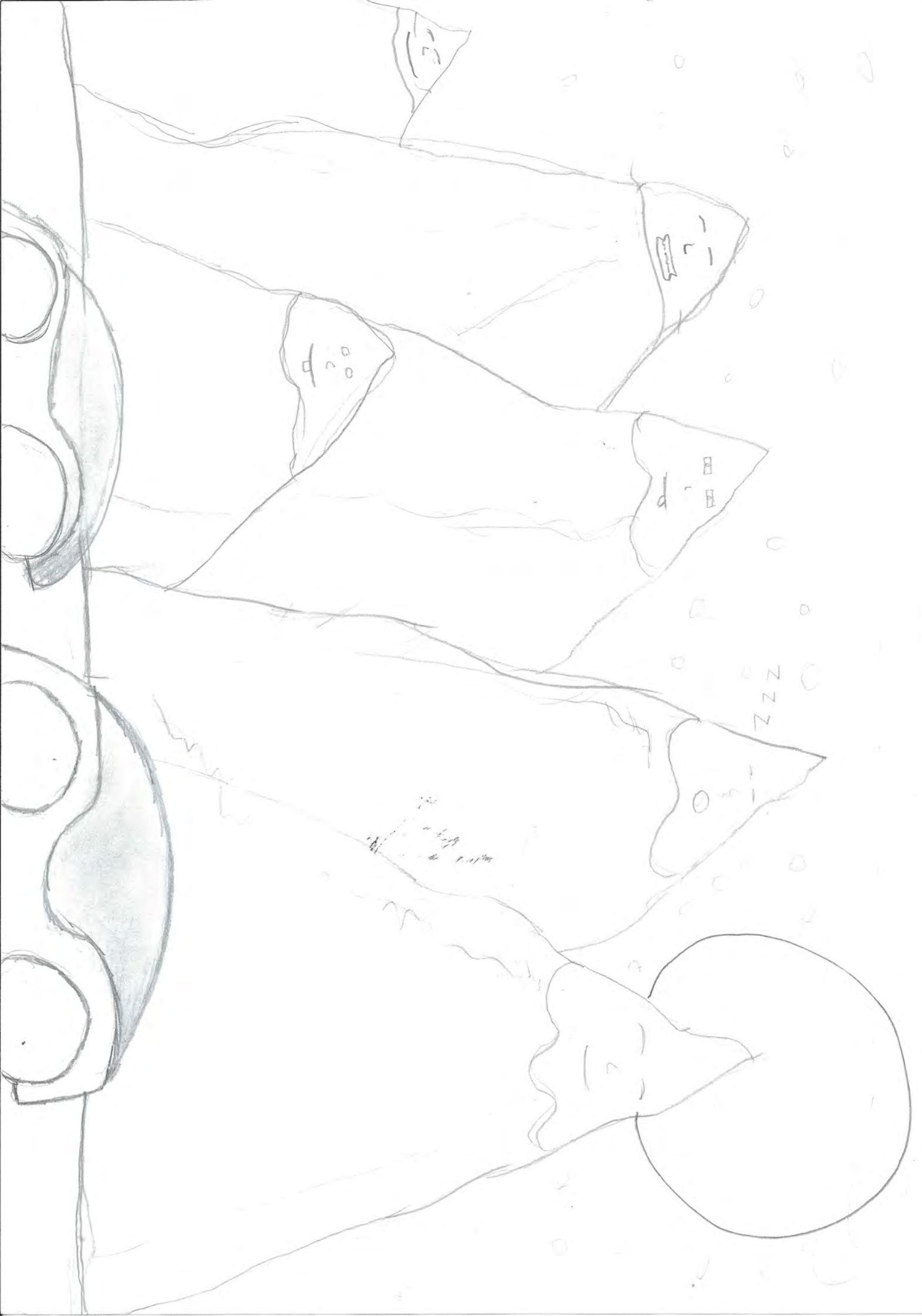






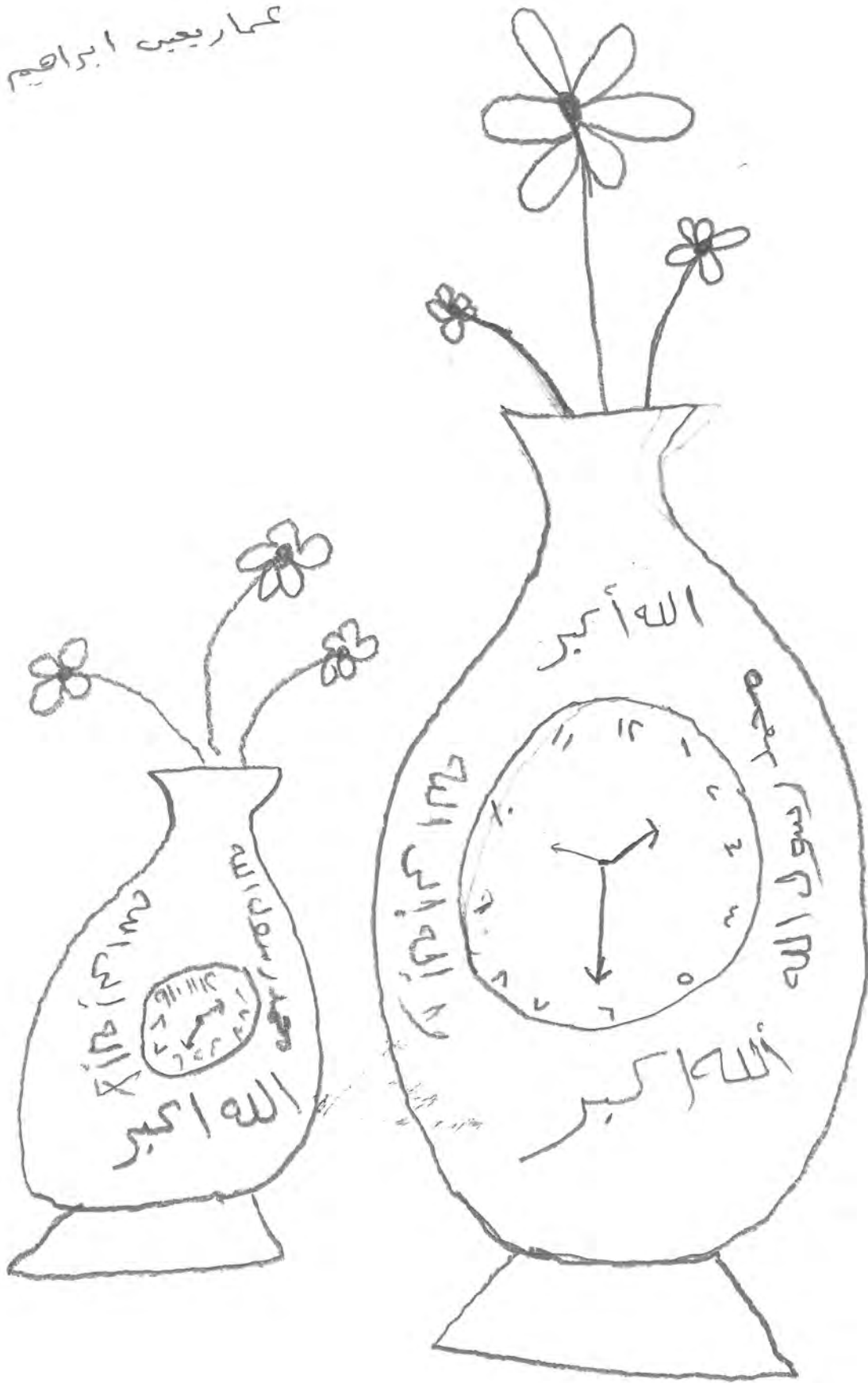


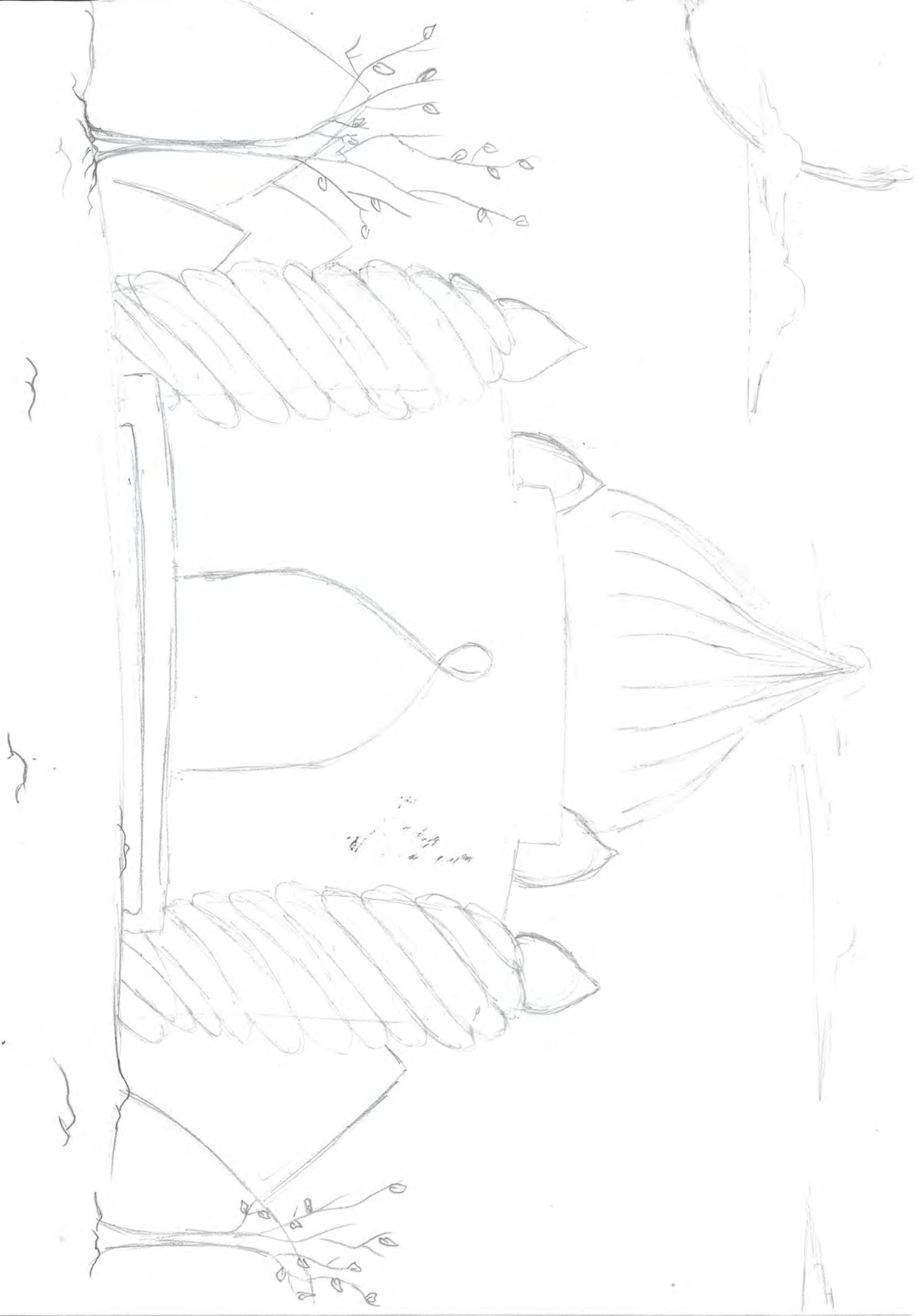




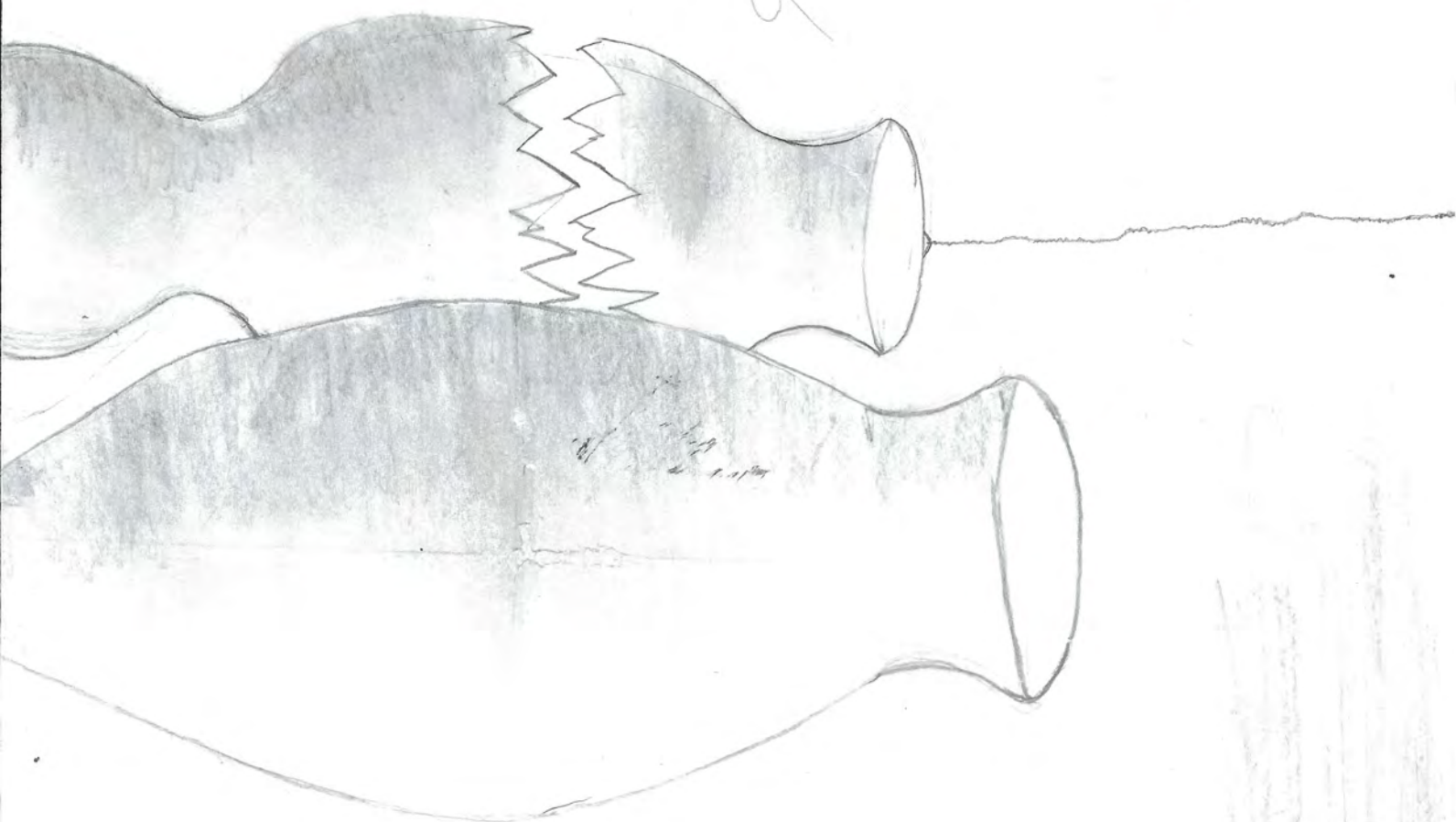


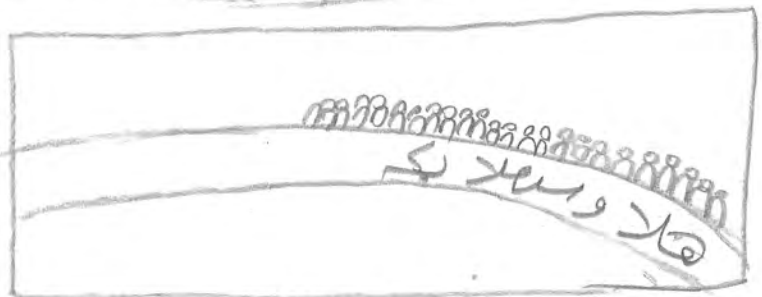
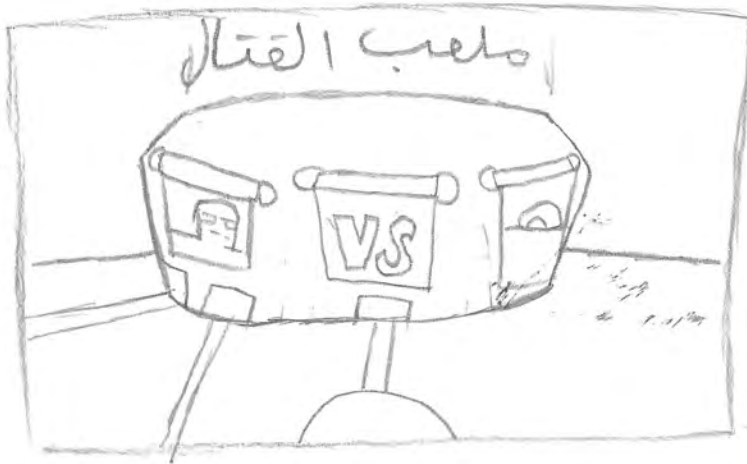
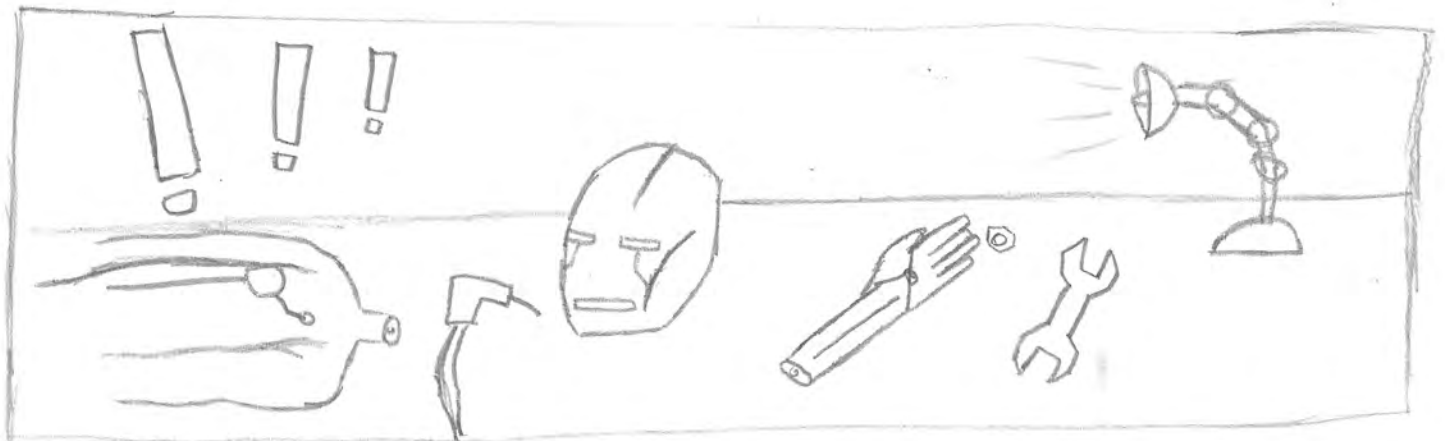
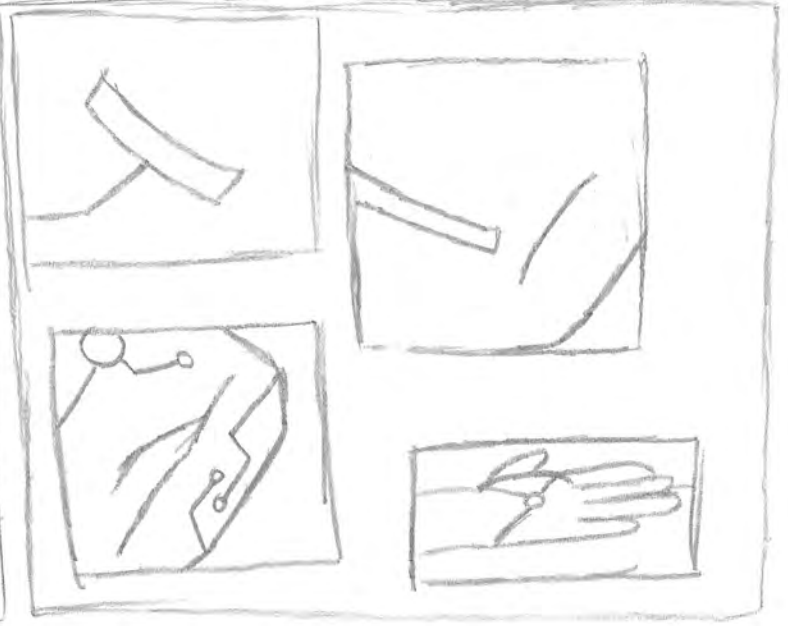
عمار يحيى ابراهيم عناية





سید  
عزت  
خان  
کمال

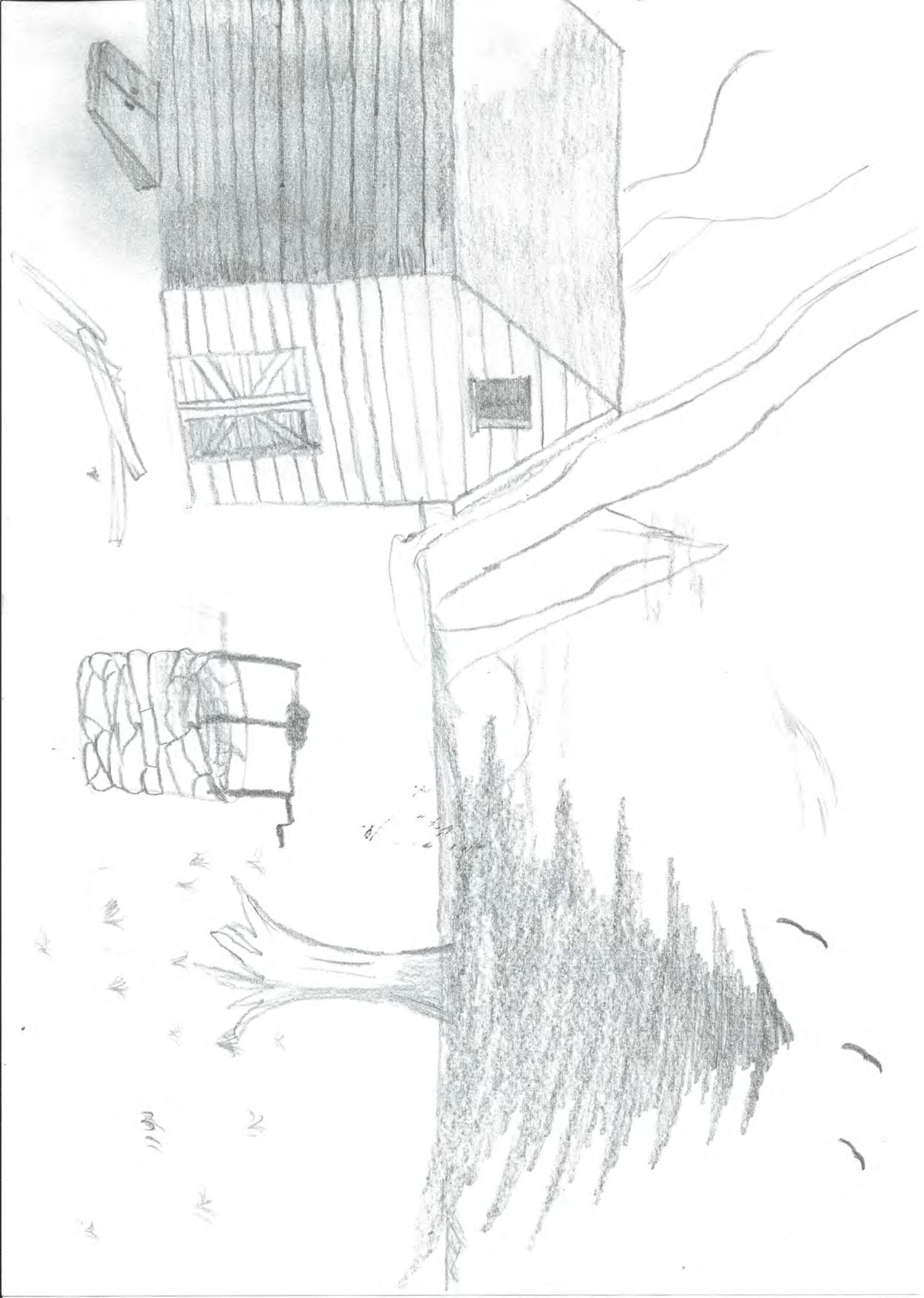




الجزء ١





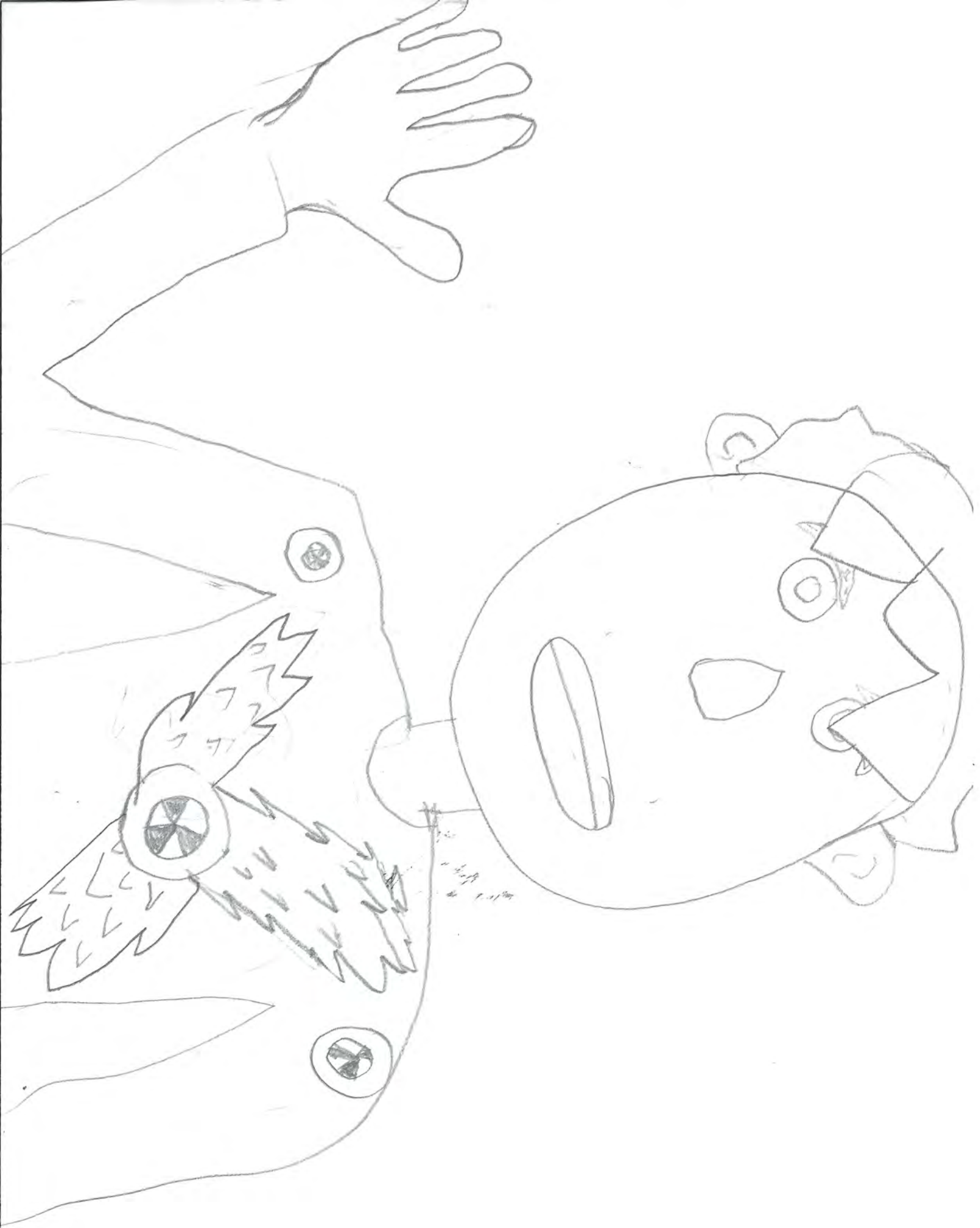






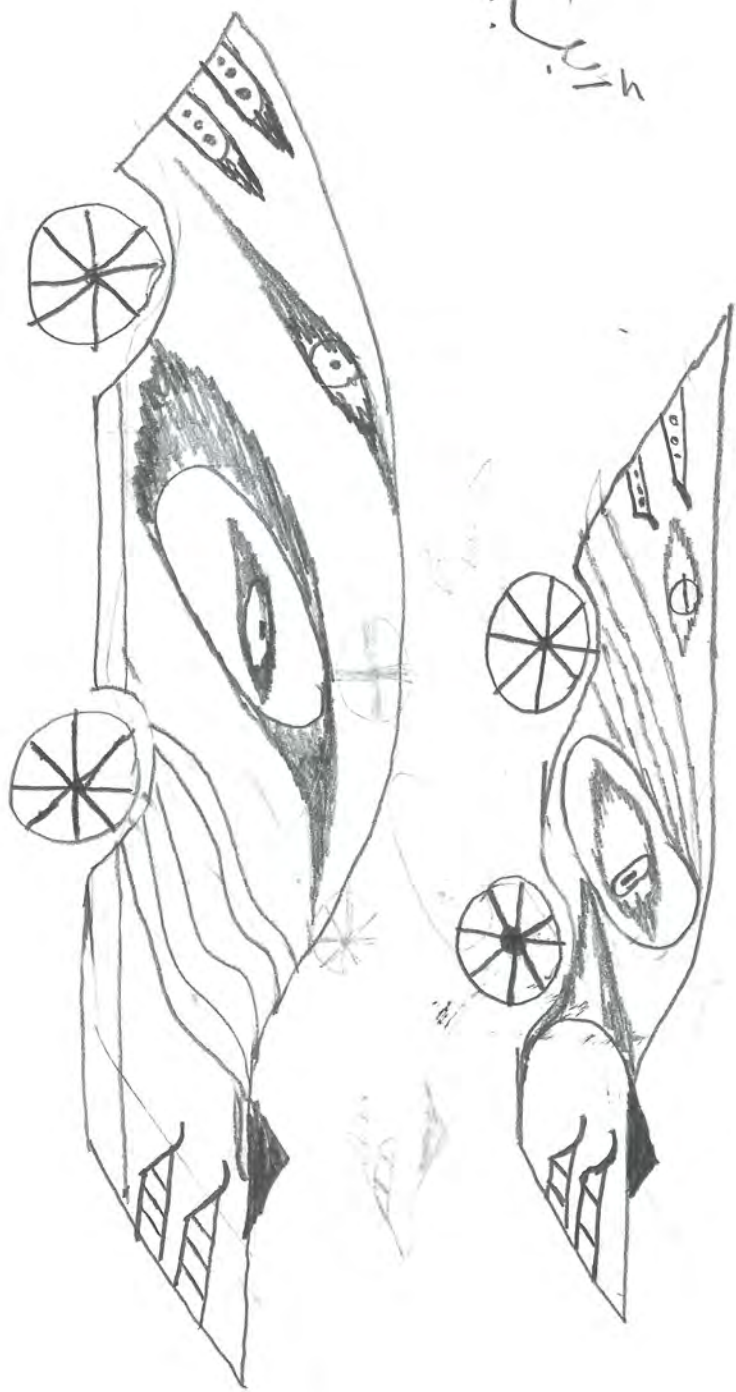


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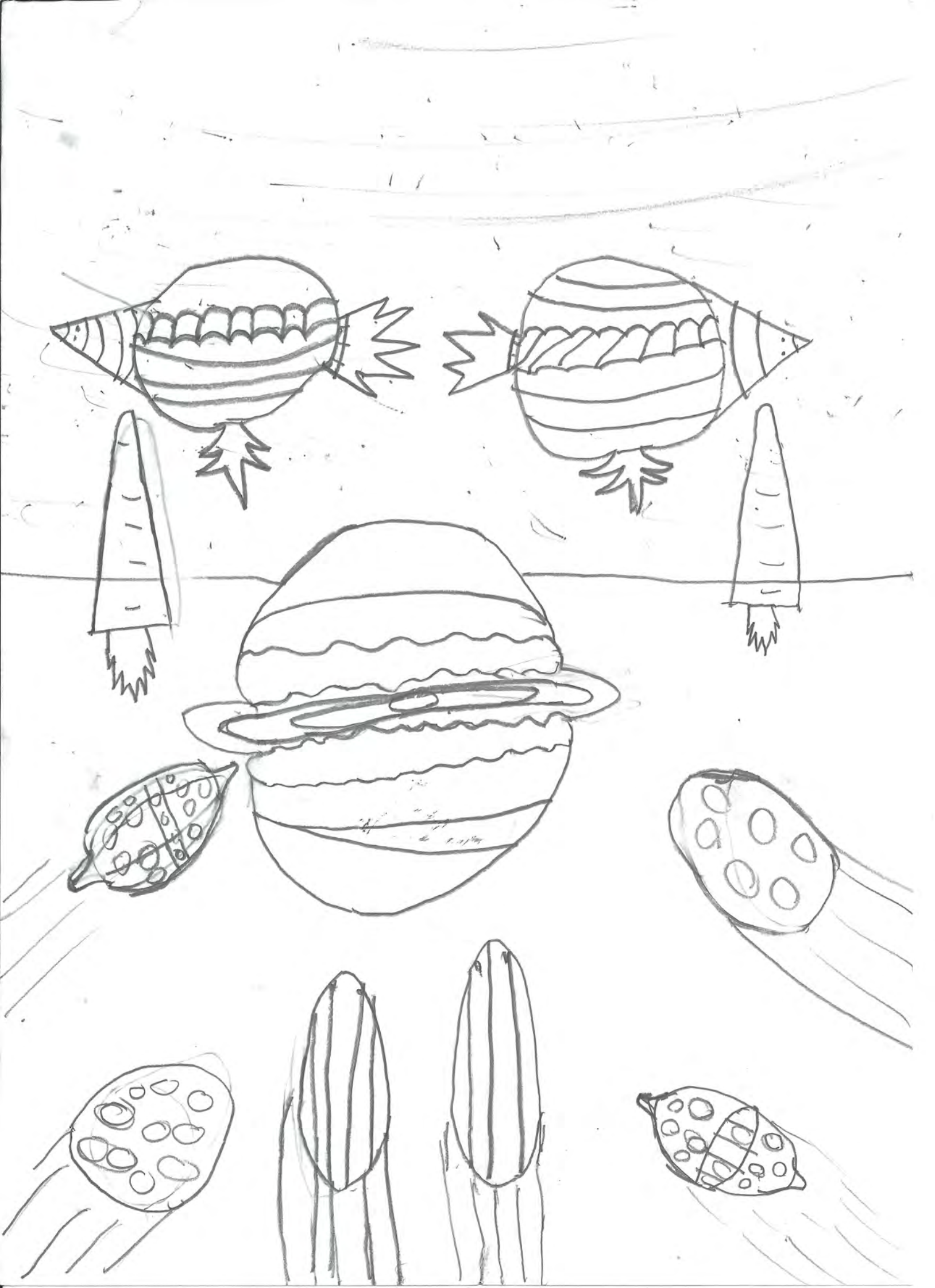
1/1

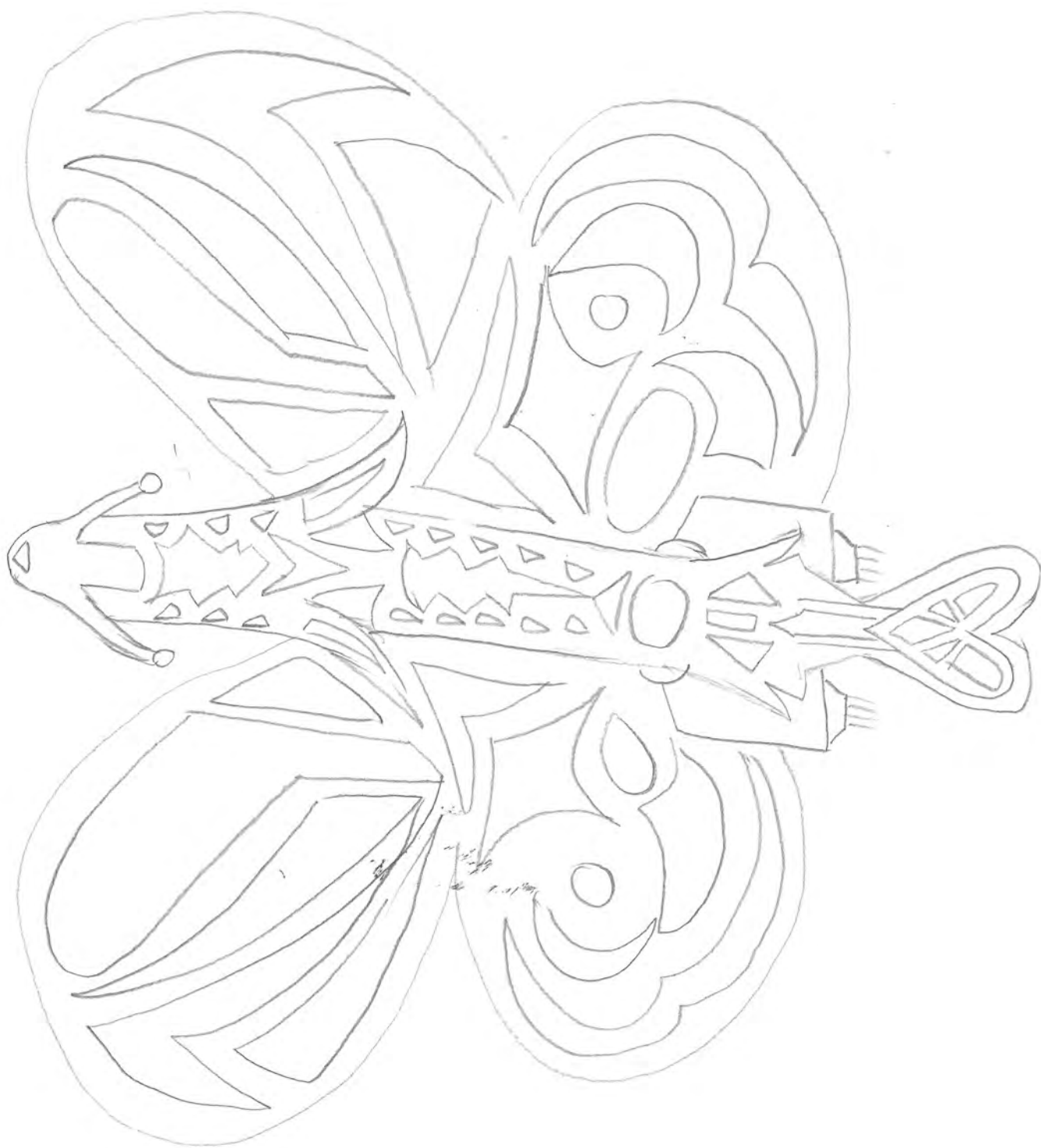
مجلس سداية



## **Experiment 7**

Experiment 7 tested for evaluation only and excluded the other two variables. The design brief in this experiment will not include themes as instruction was not tested.



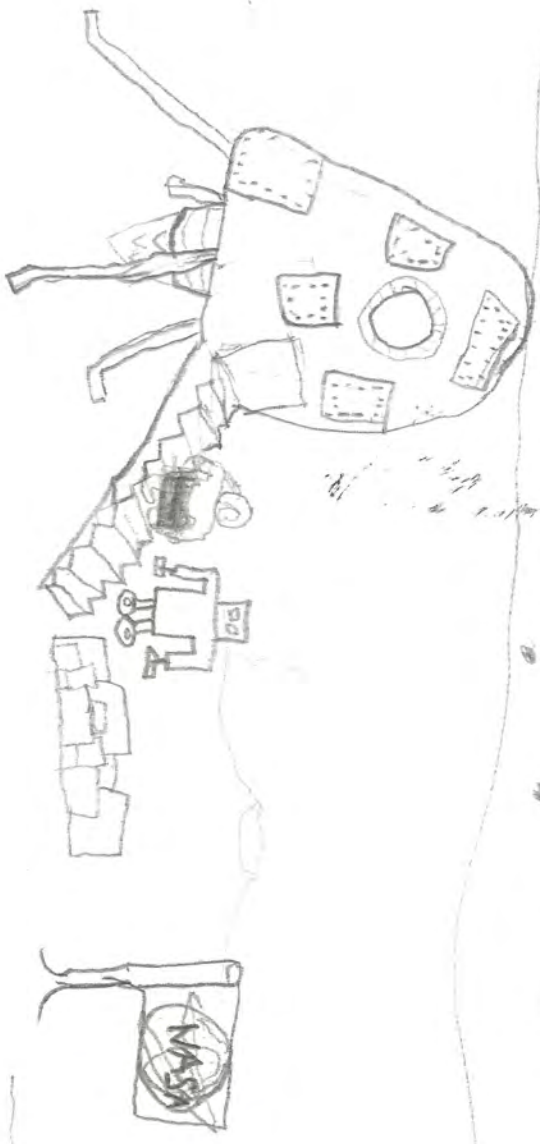


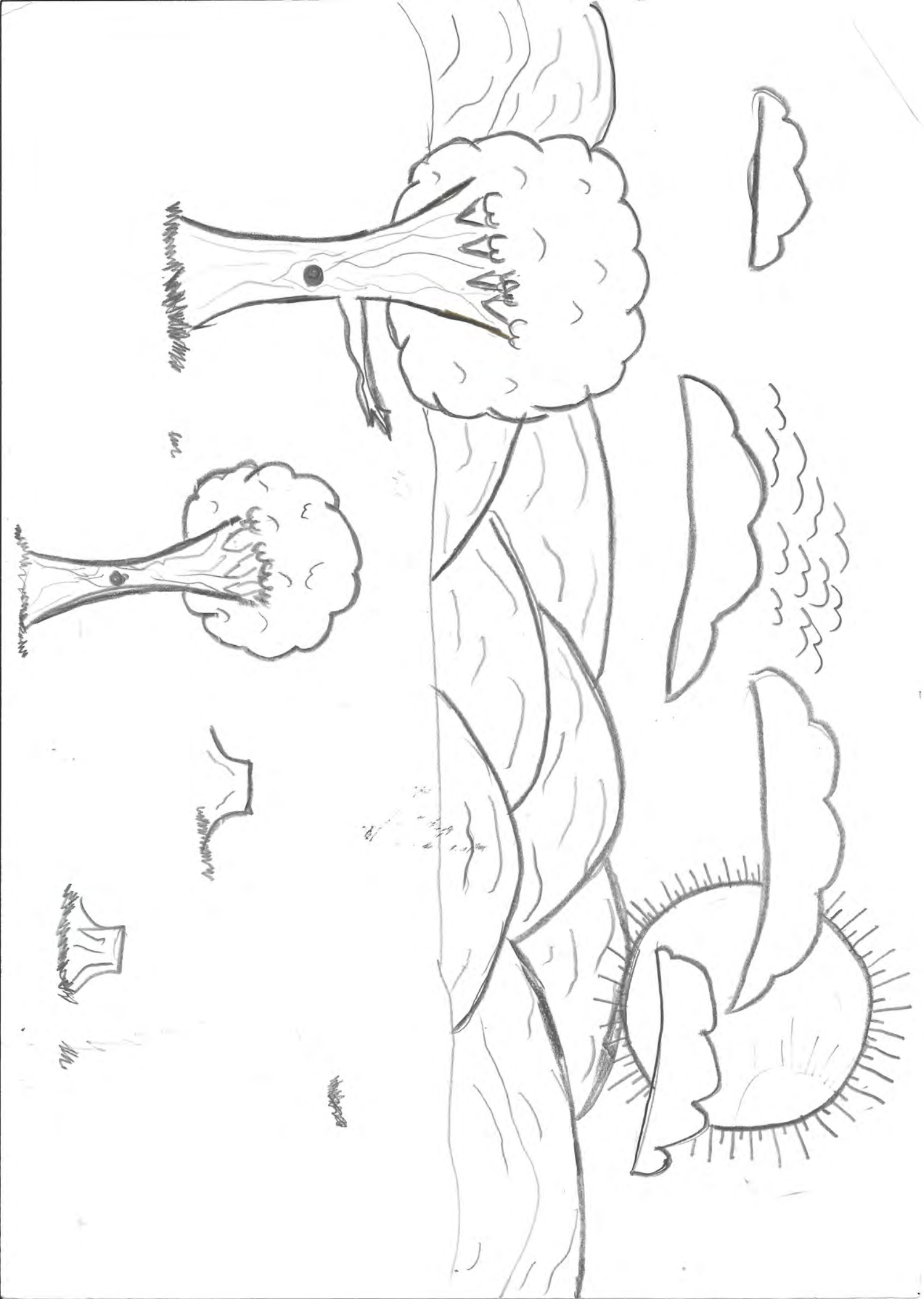




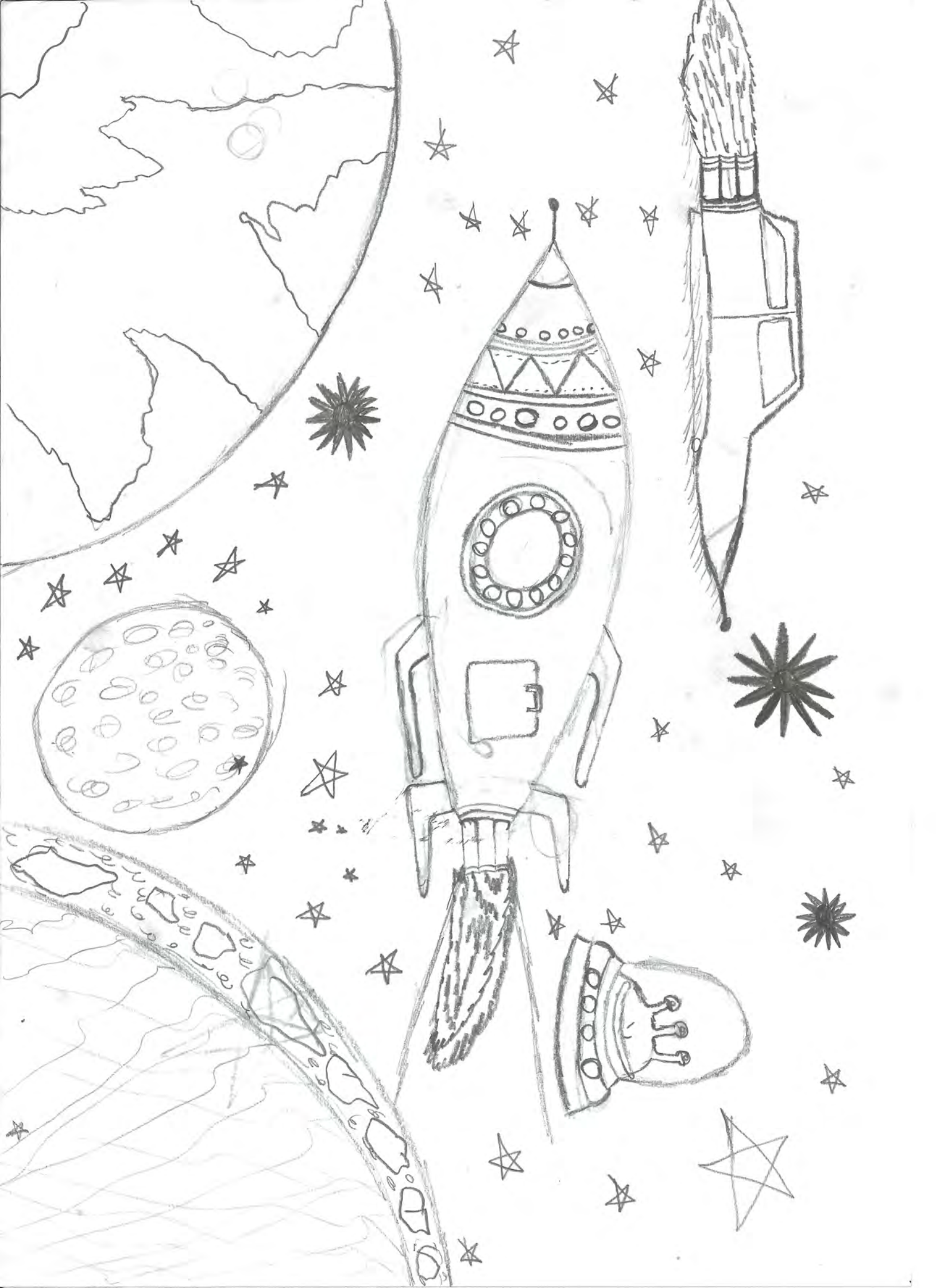


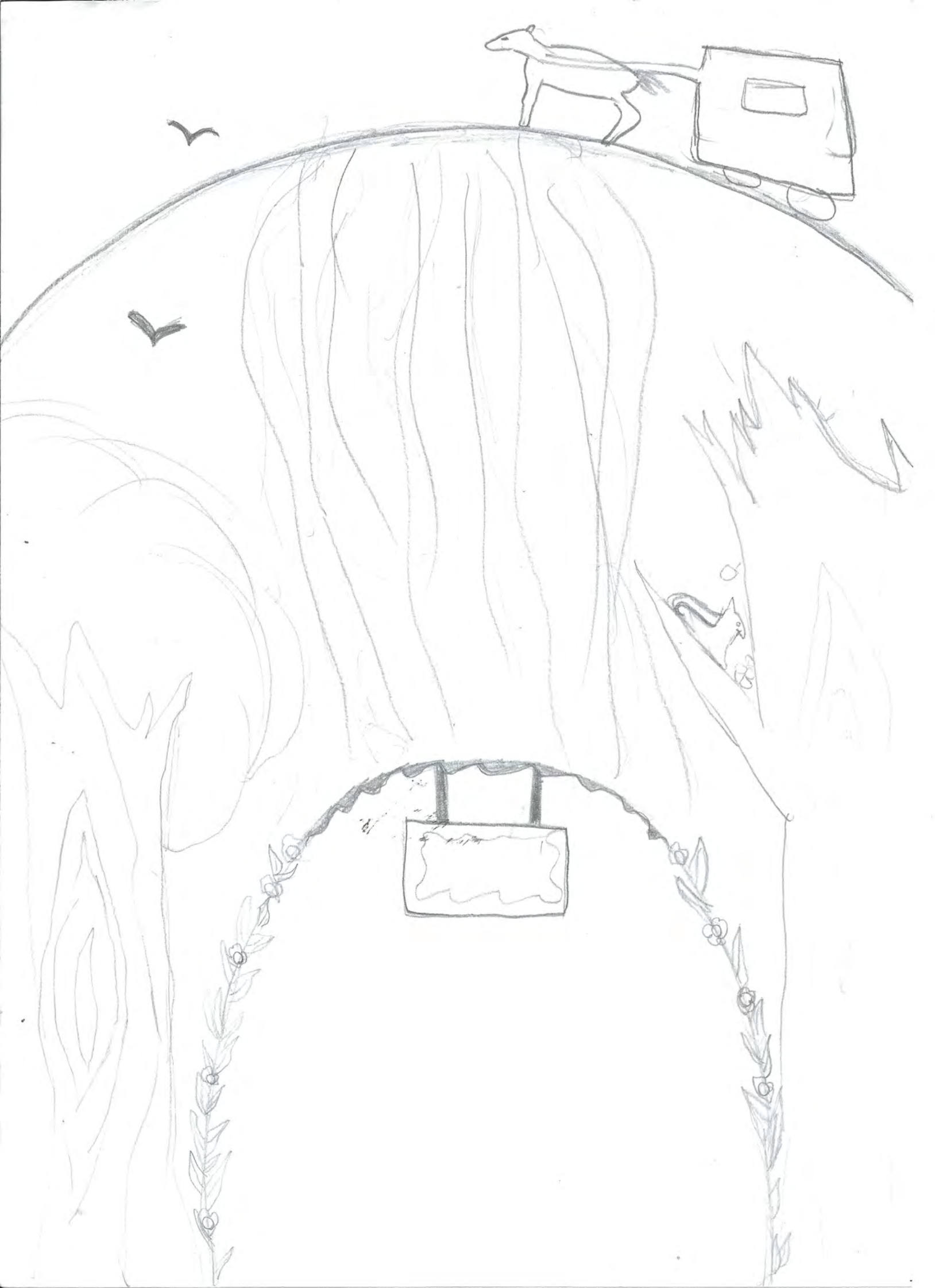






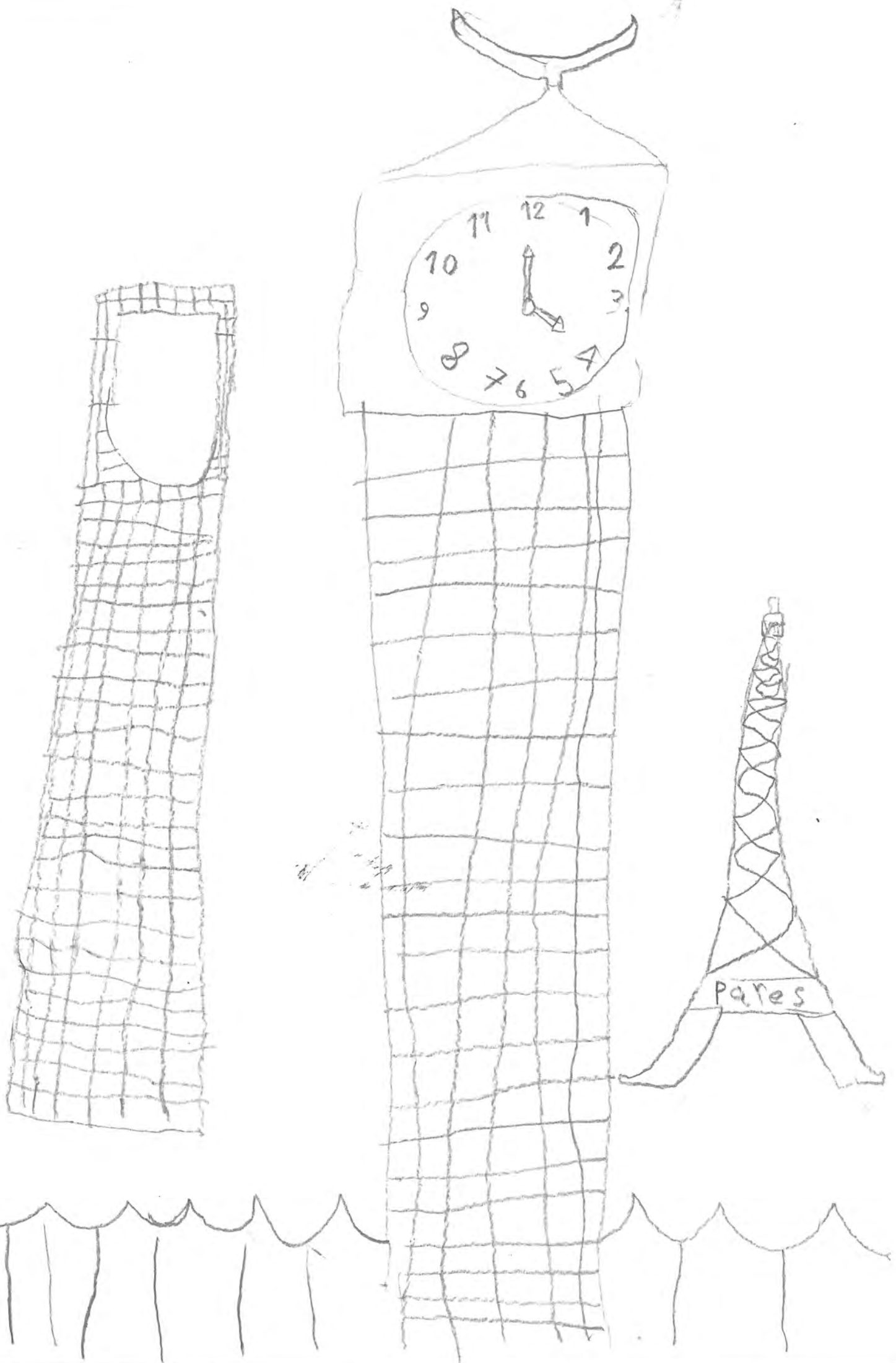




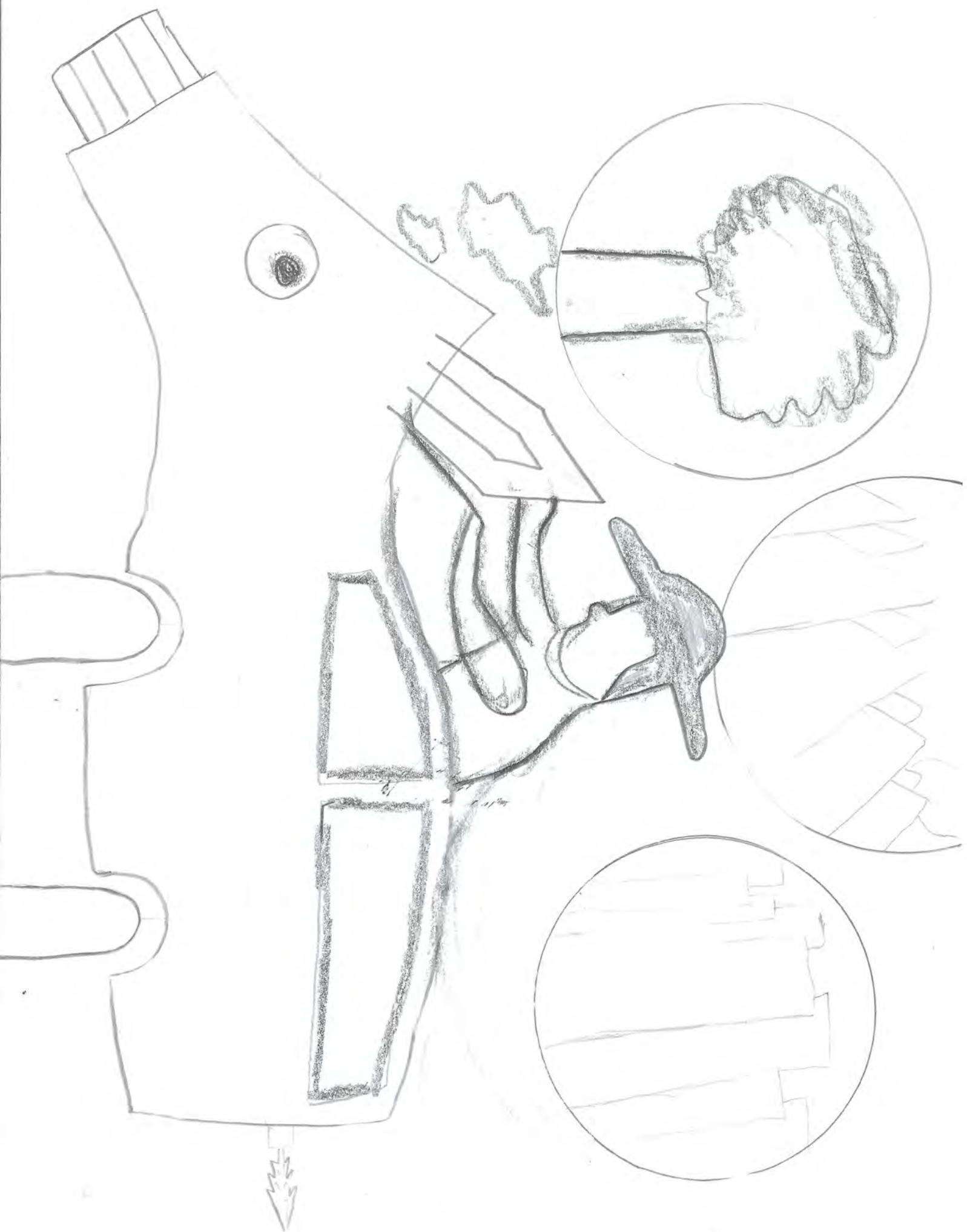


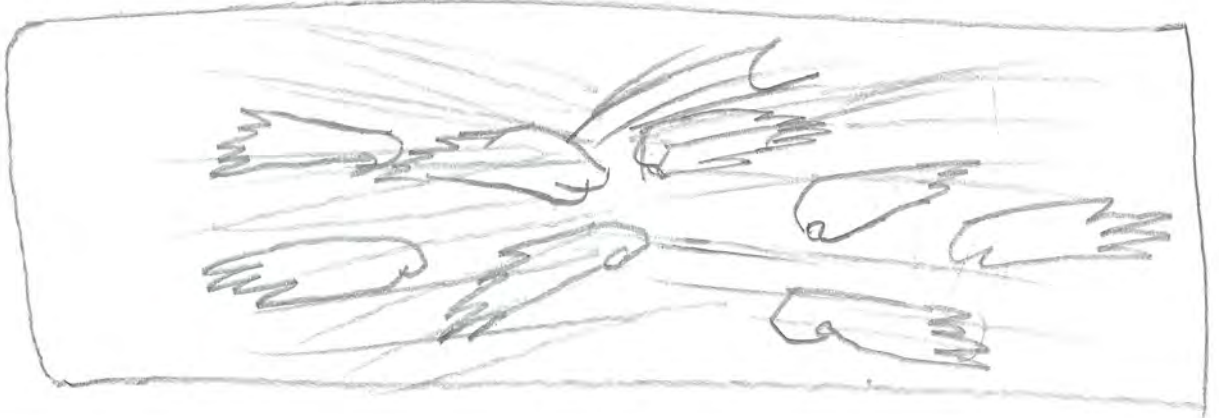
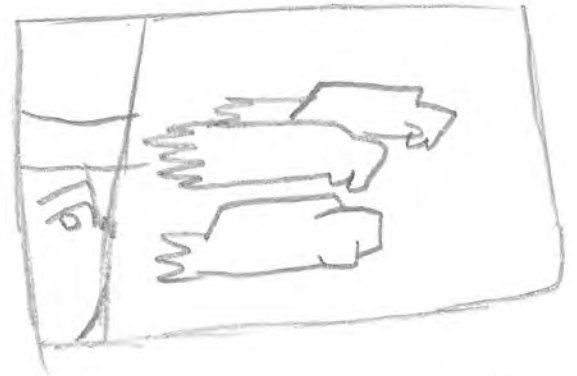
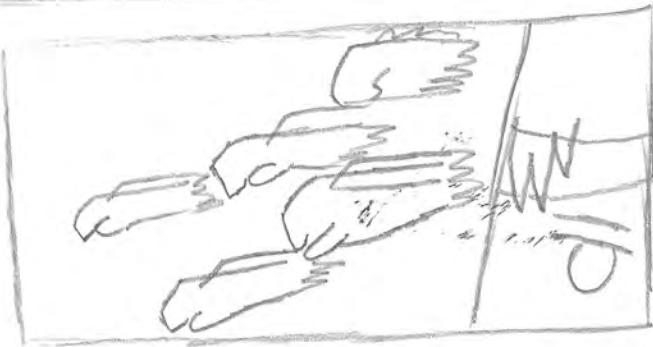
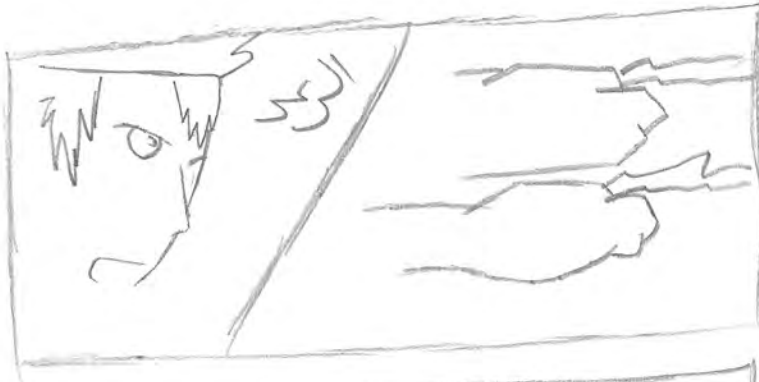
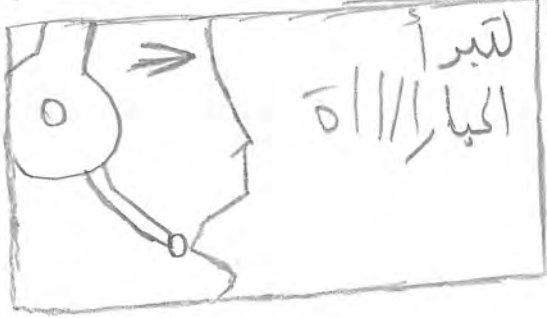




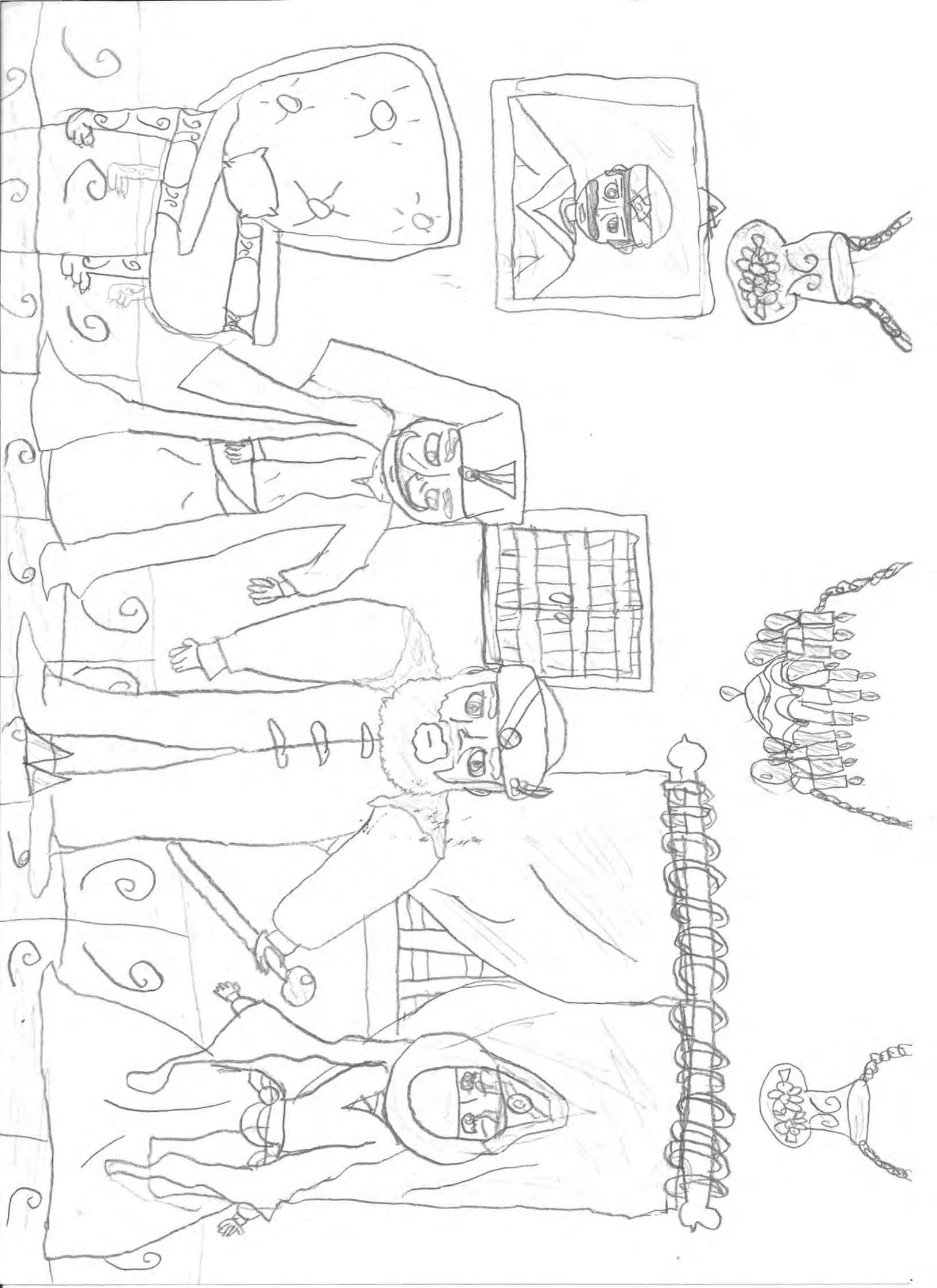








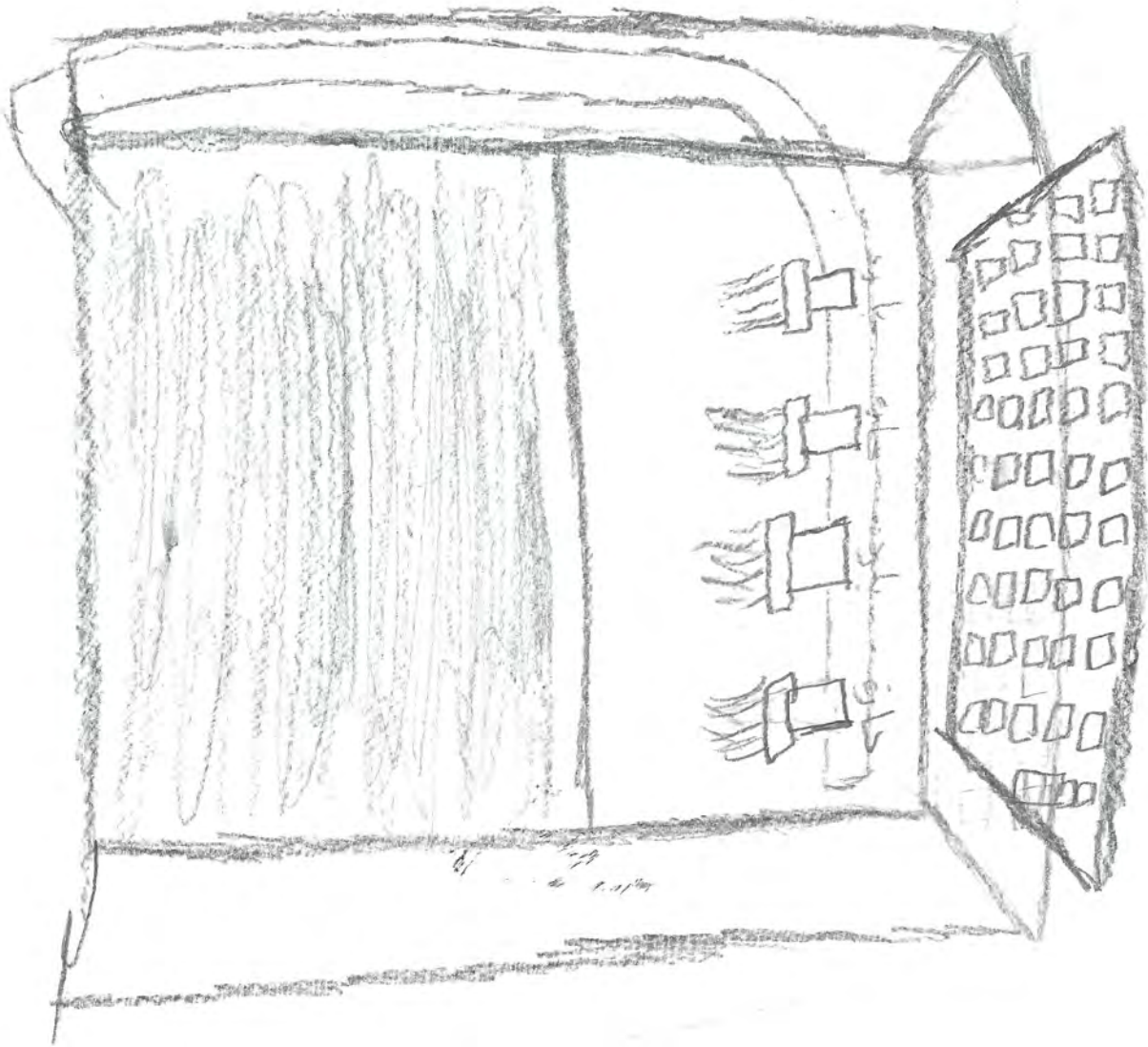
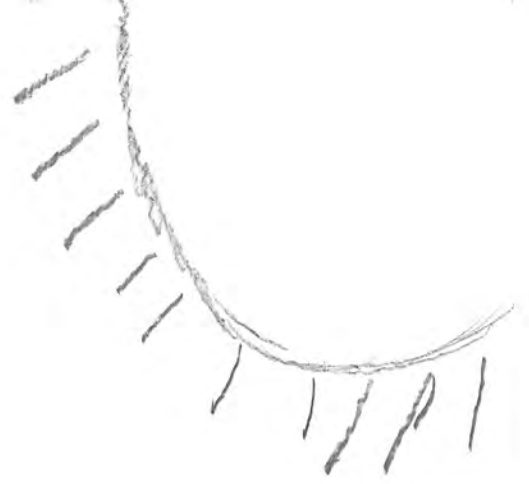
الركب





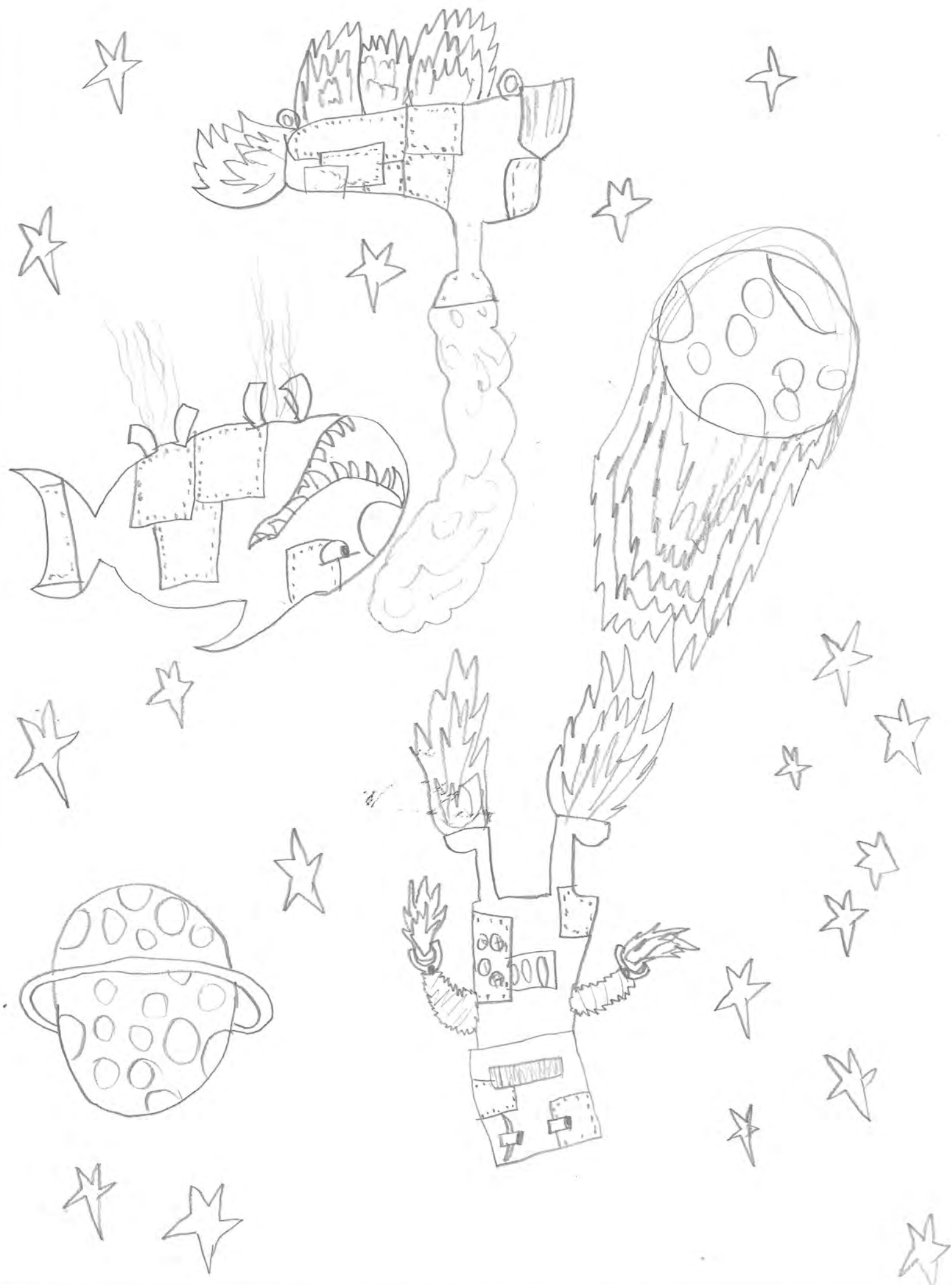






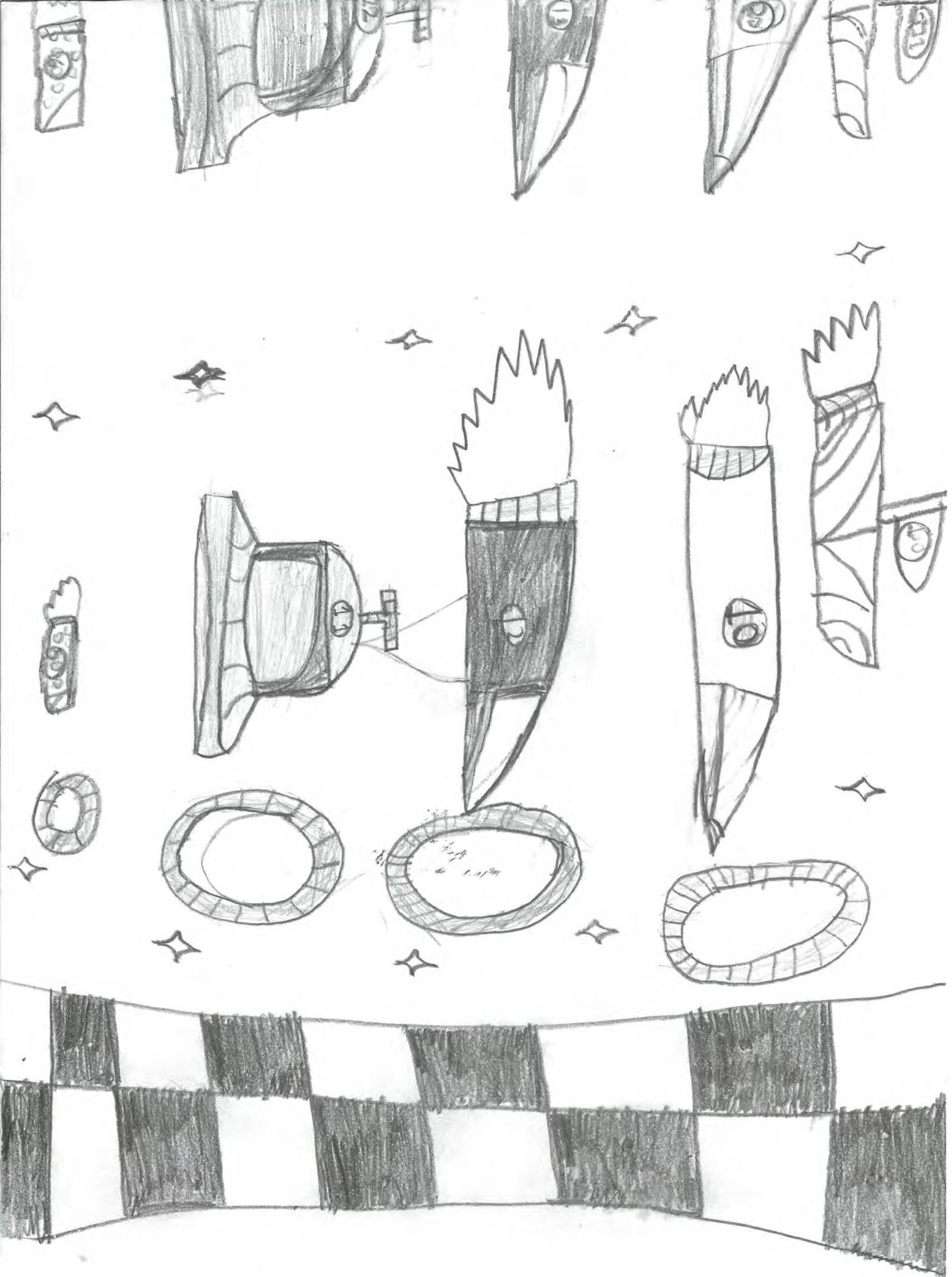




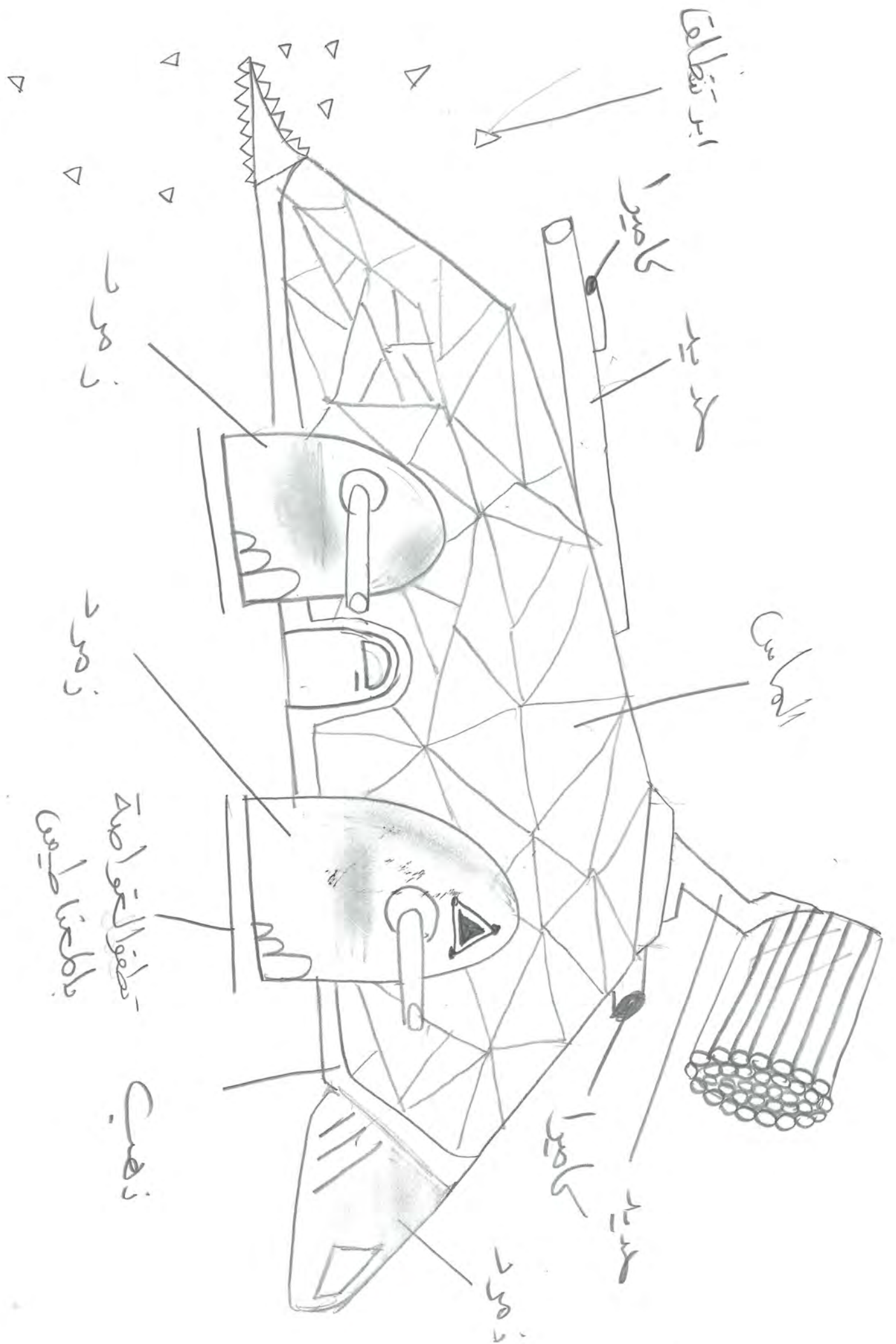


## **Experiment 8**

Experiment 8 was conducted without any of the involvement variables being tested. The design brief in this experiment will not include themes as instruction was not tested.





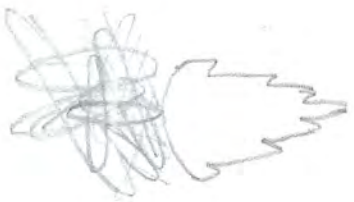
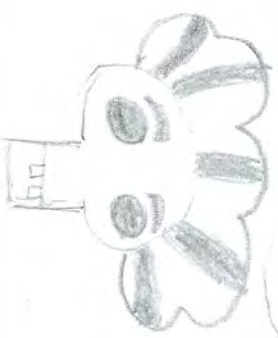


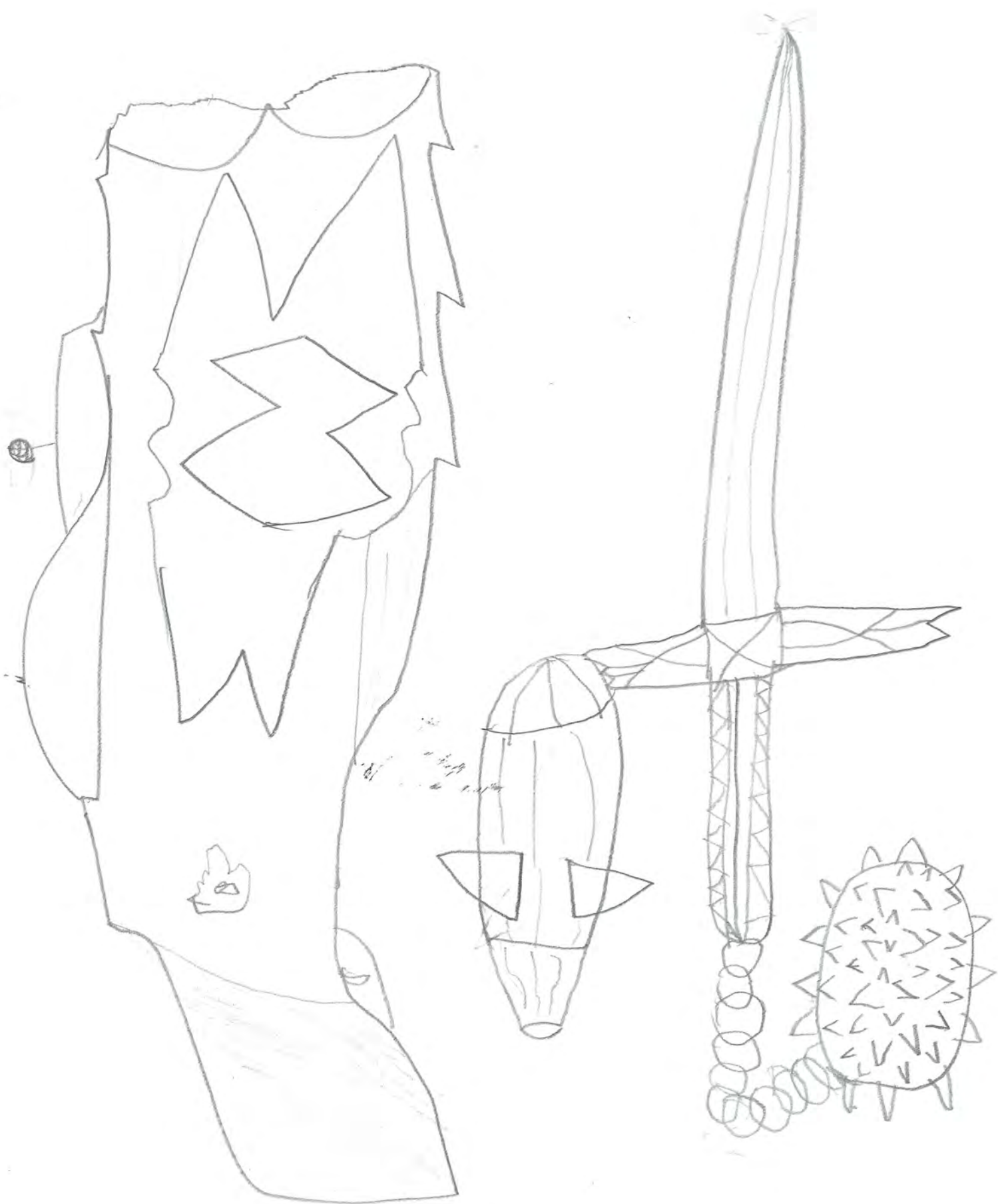


חלוצים

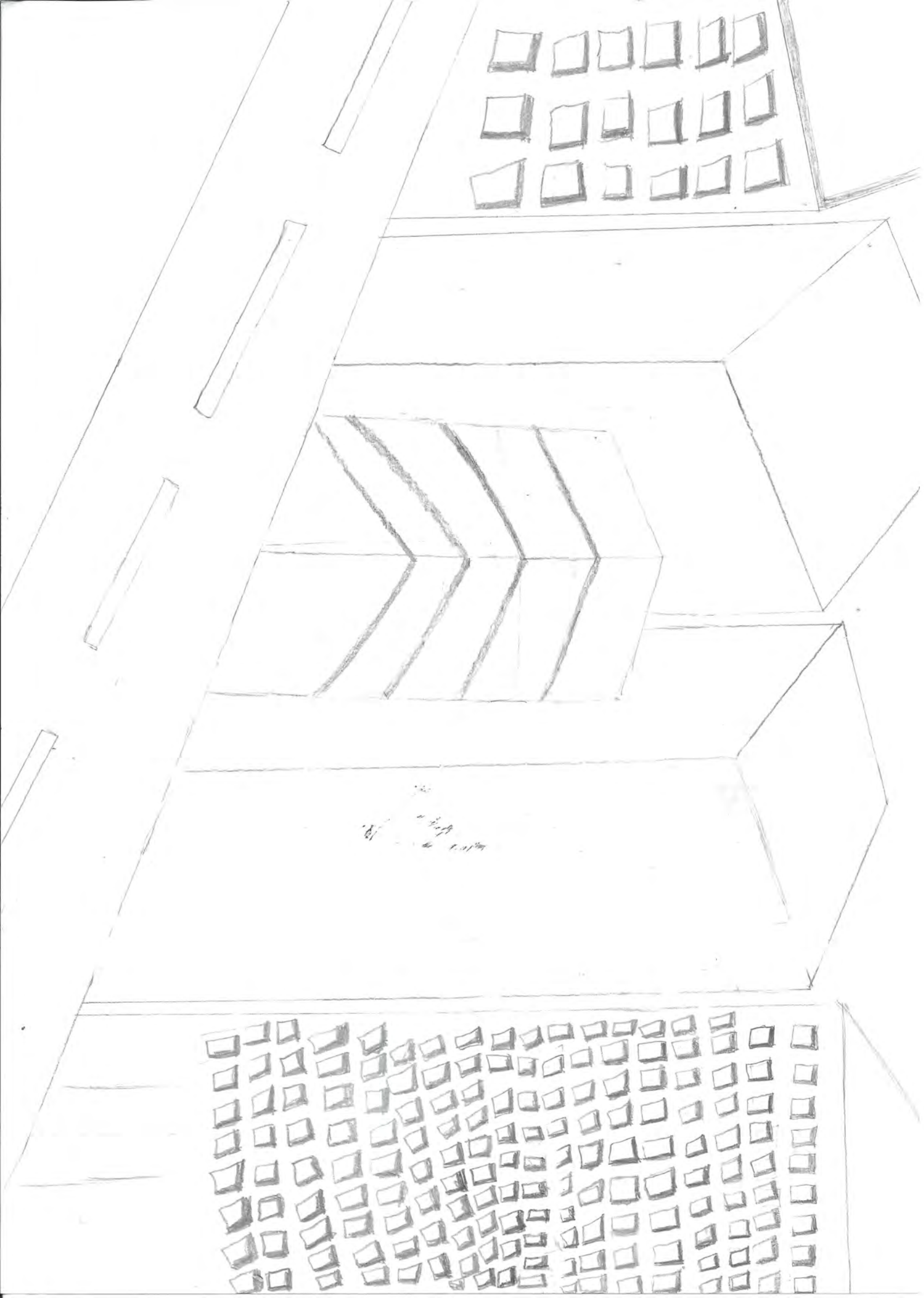


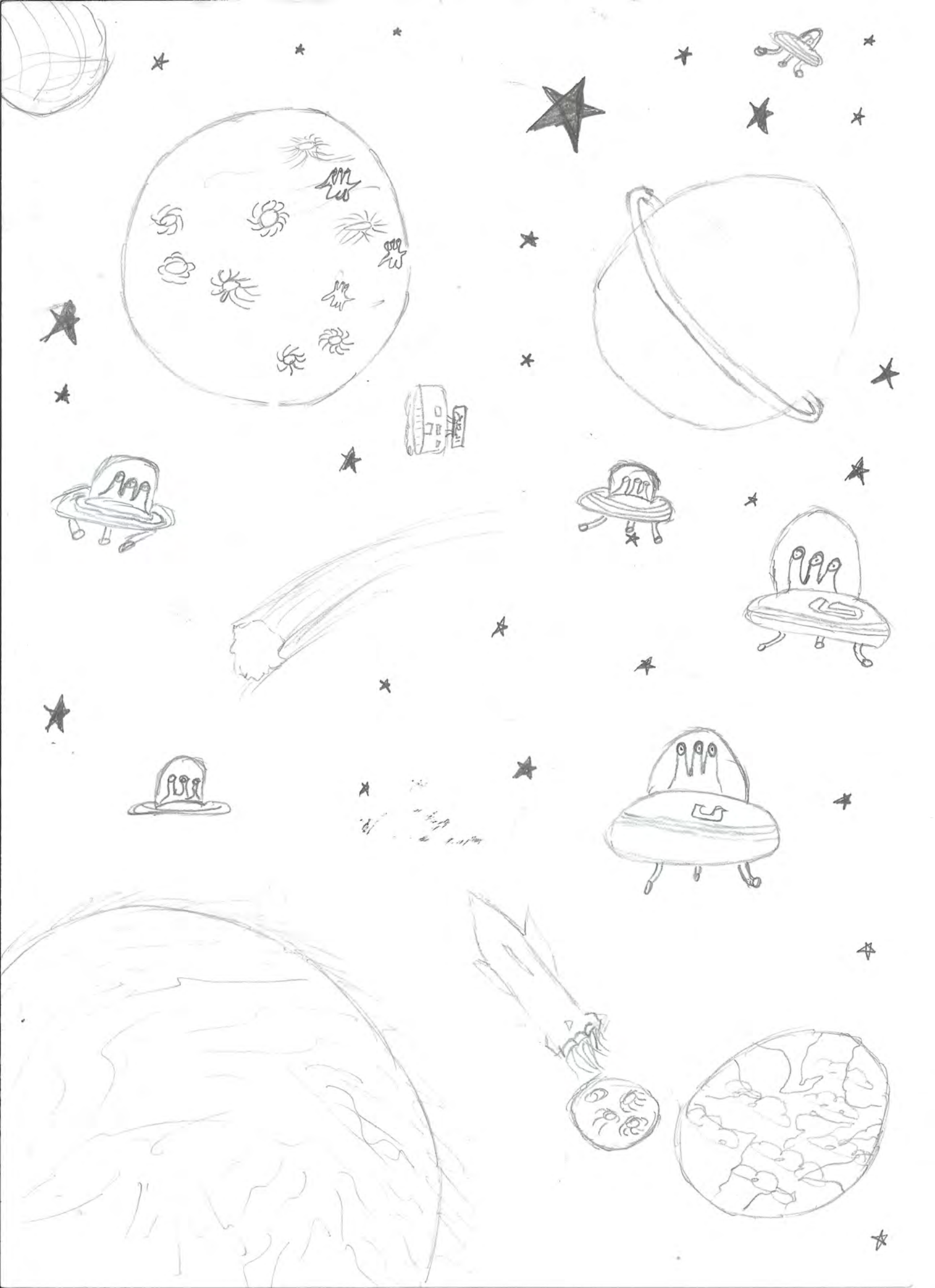
החלוצים

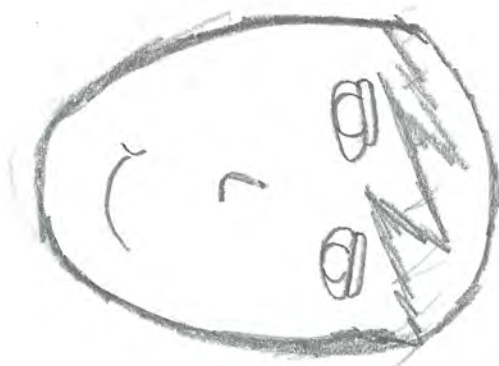
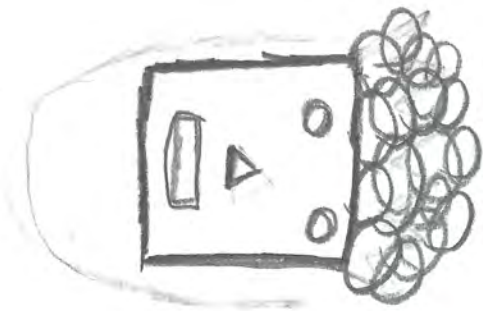




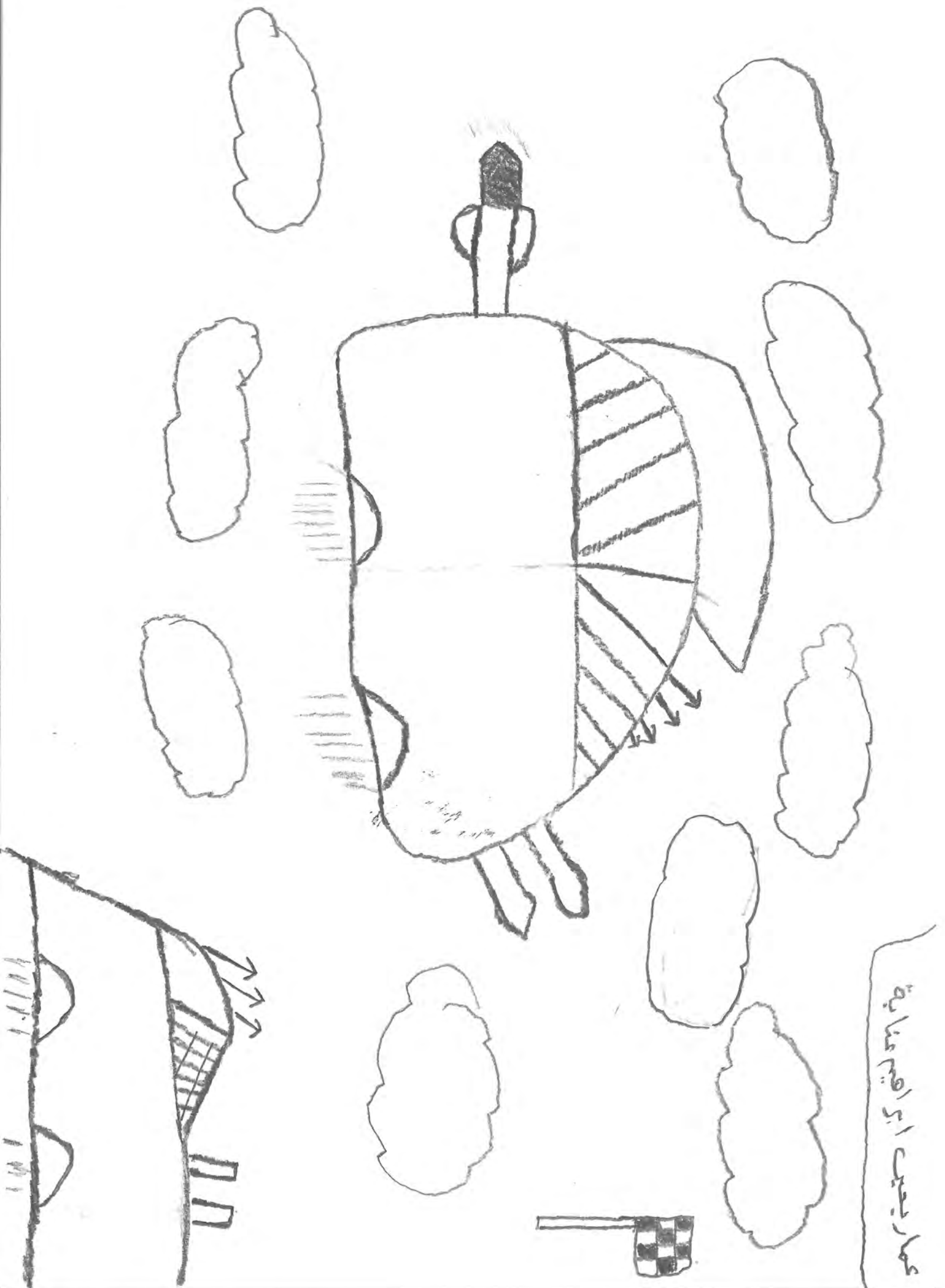






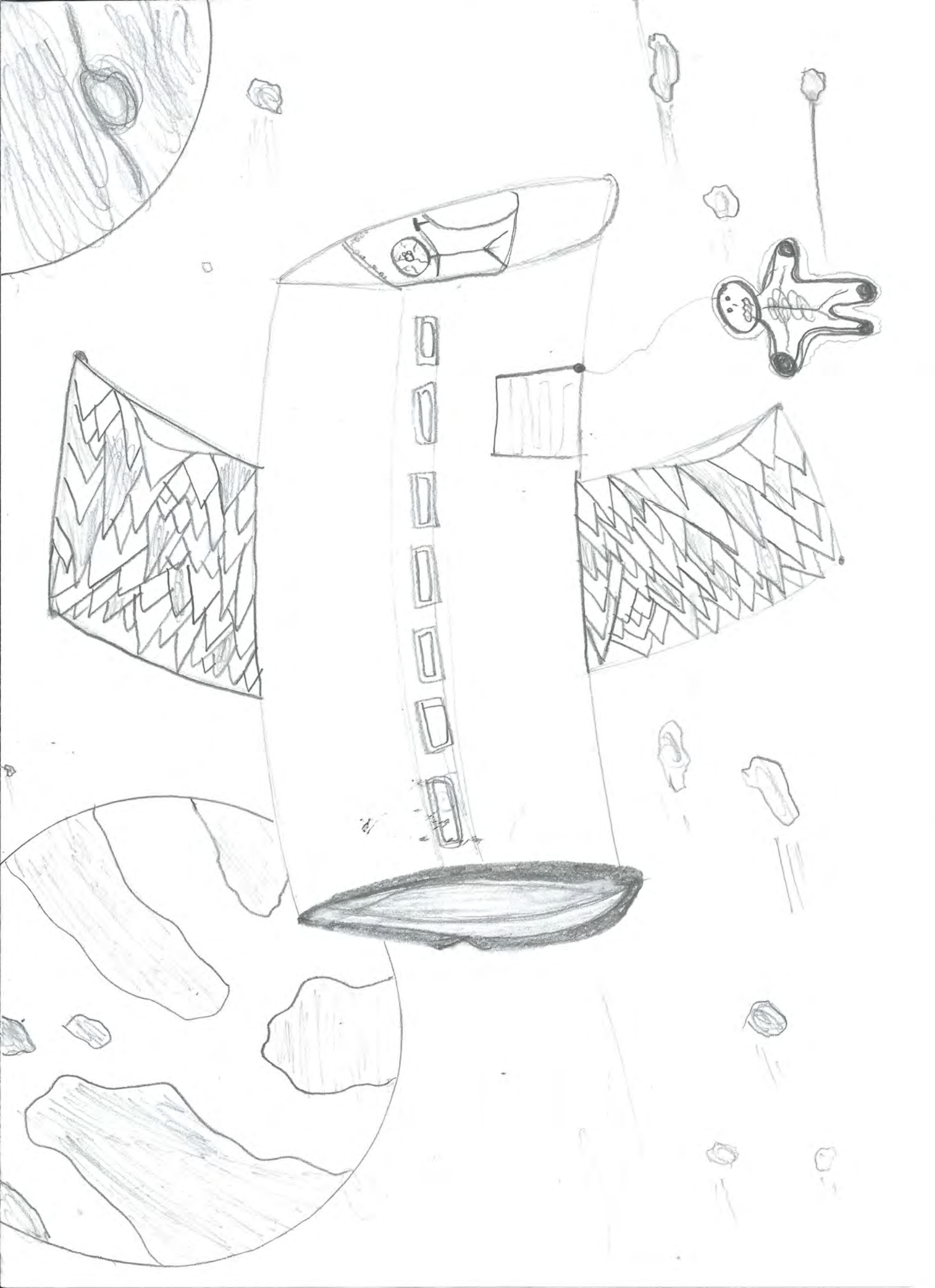


عمار یحییٰ ابرار اقامت منار



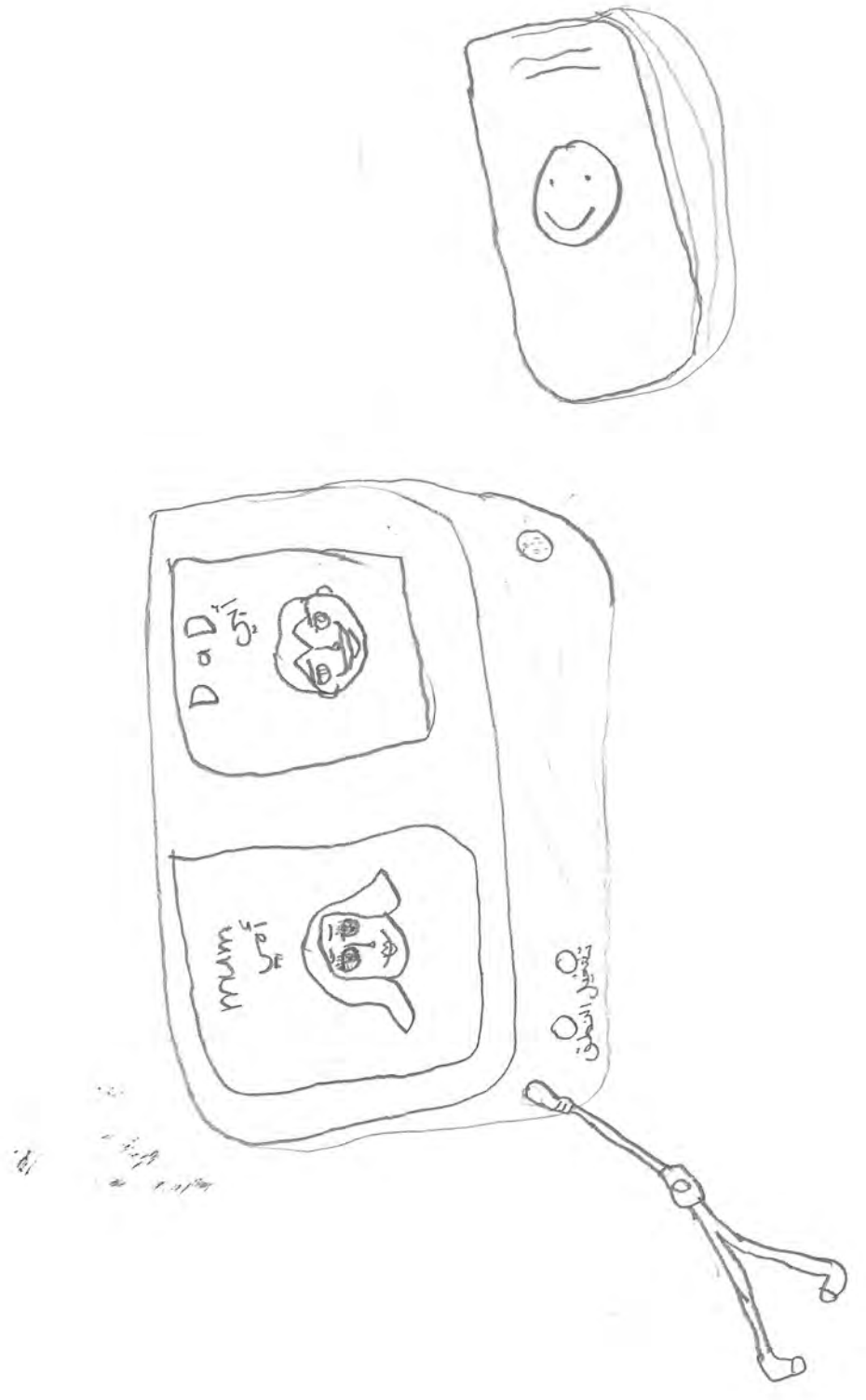




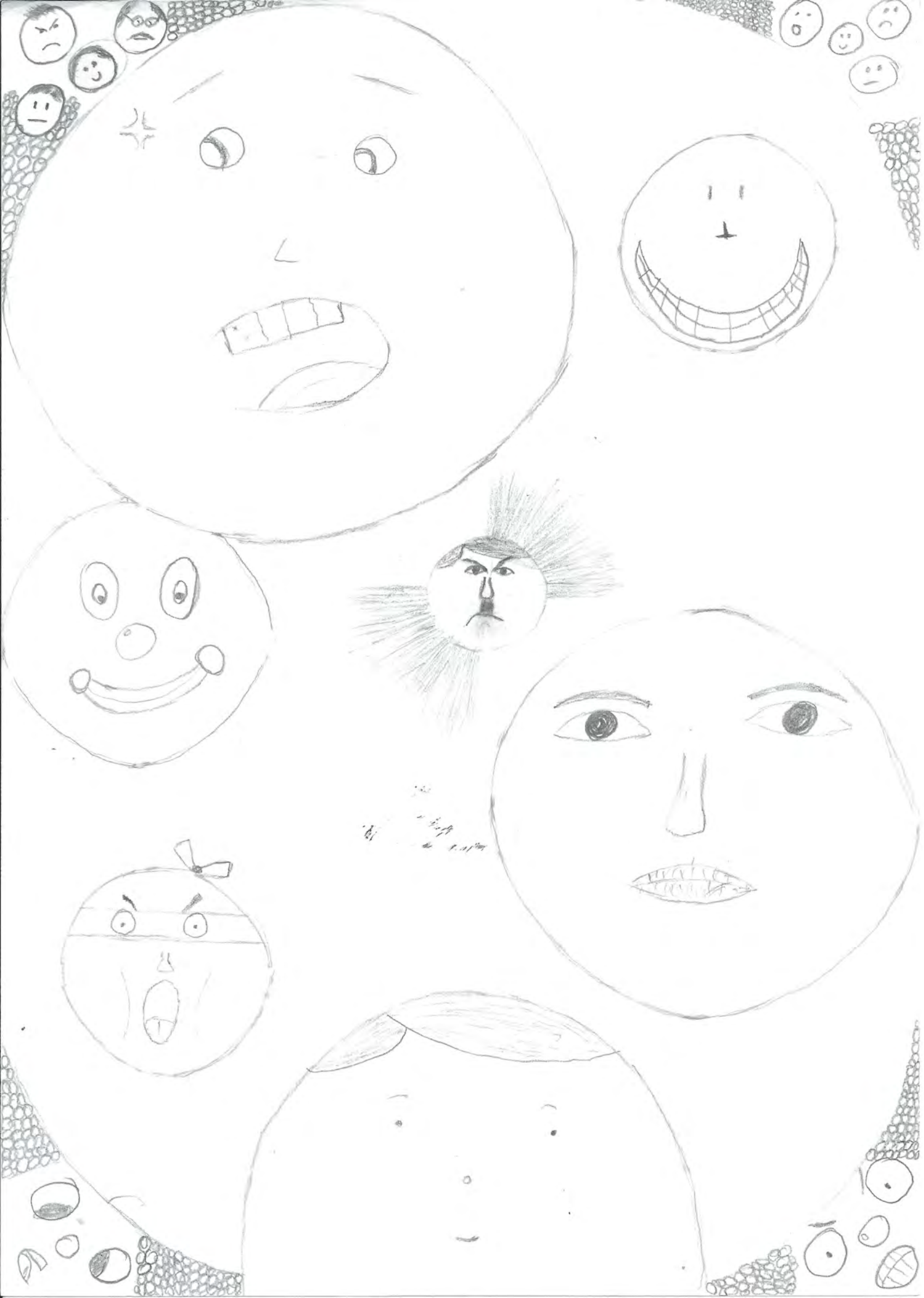




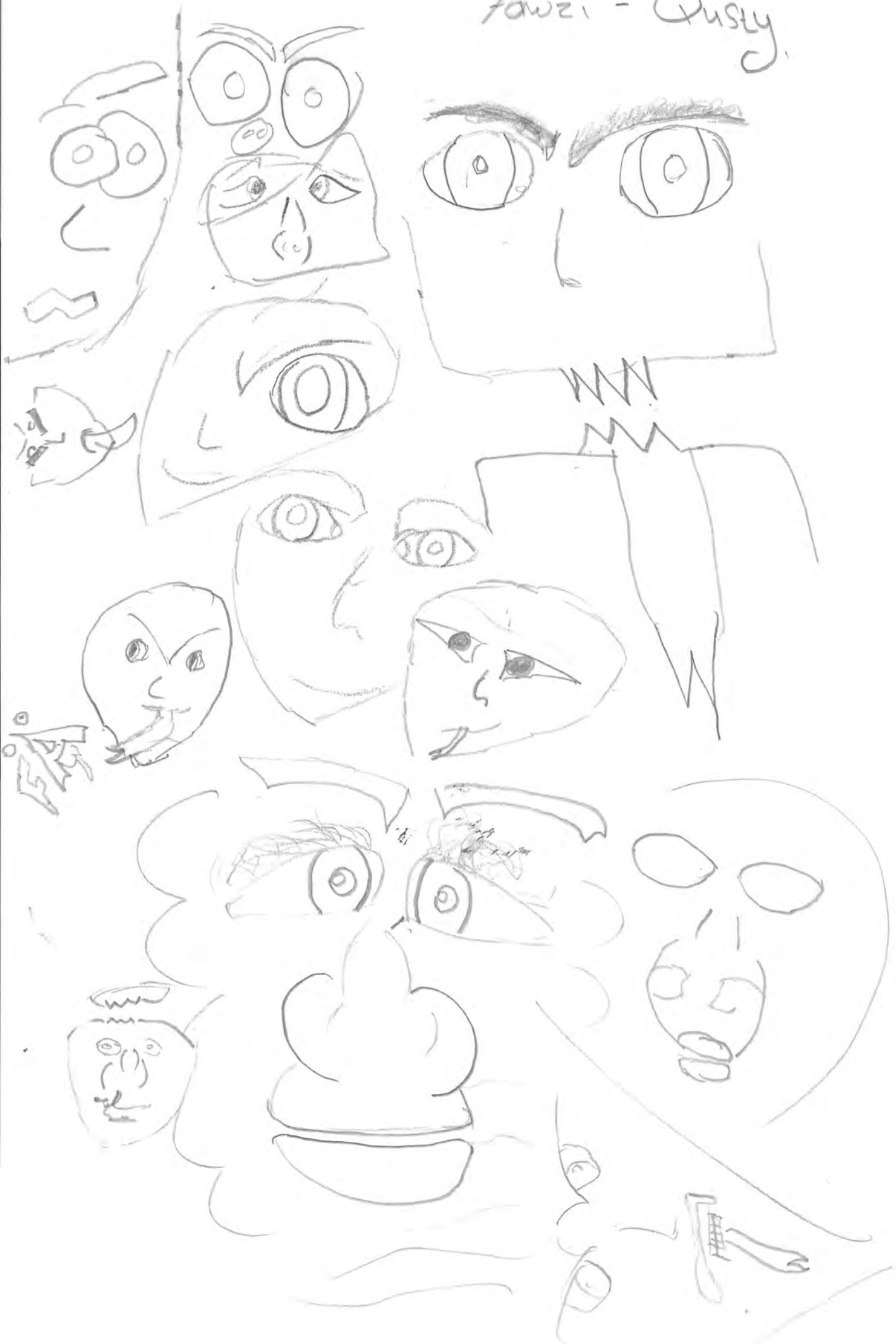




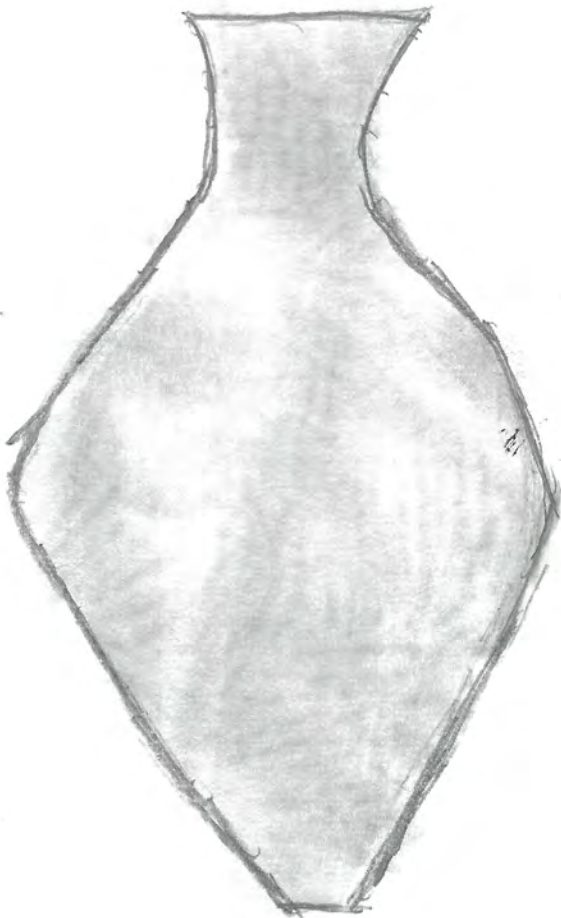




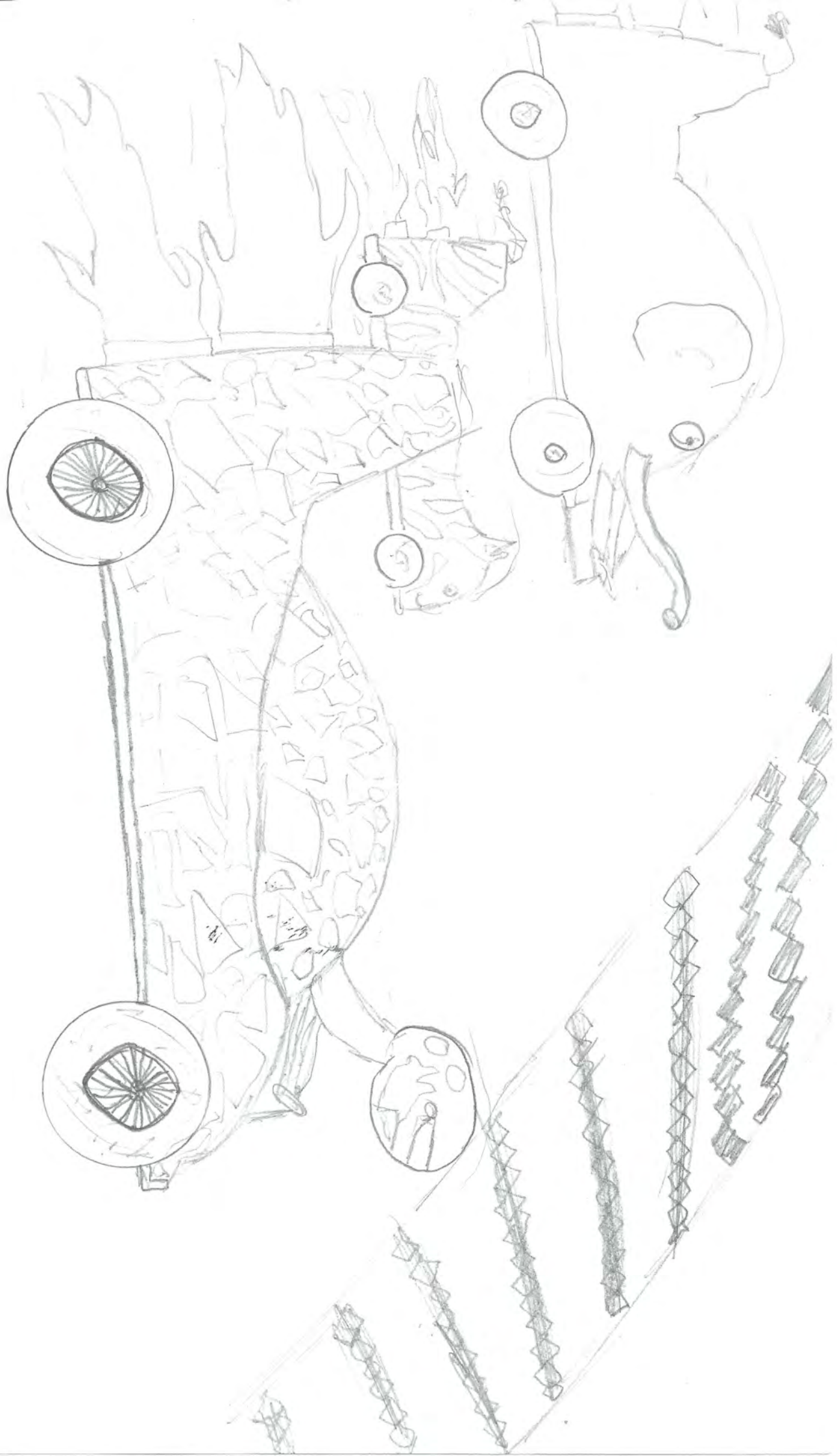
Fawzi - Qusly



خارجي زكي اللقاني







## **Experiment 9**

Experiment 9 was the control experiment where all variables are tested. The design brief in this experiment will be draw a sea.



